

The importance of the medico-legal autopsy

Kasinathan NADESAN *MRCPath, FRCPA*

Associate Professor and Consultant Forensic Pathologist, Department of Pathology, University of Malaya.

Abstract

All deaths due to unnatural causes and deaths that are believed to be due to natural causes but where the medical cause of death is not certain or known are subjected to an inquest. The objective of an inquest is to ascertain facts pertaining to the death. This is achieved by inquiry and at the conclusion of the inquest a verdict is arrived as to whether the death was due to a natural, accidental, suicidal or a homicidal cause. An inquest is not a trial. There is no complainant or defendant and at the conclusion of the inquest no judgment is passed. The inquest system exists in all parts of the world. In the English legal system, the person who conducts an inquest is called a Coroner. In Scotland, he is called a Procurator Fiscal. The United States of America use the Medical Examiner system. Most continental European countries and their former colonies follow the Code Napoleon.

A postmortem examination may become necessary in certain deaths that come up for inquests. In these situations the authority which conducts the inquest will order a doctor to perform a postmortem examination (medico-legal autopsy). To perform a medico-legal autopsy, consent from the relatives of the deceased is not required. In an unexpected sudden death, only a doctor after a postmortem examination may be able to determine the cause of death. However, it is often wrongly assumed that the objective of a postmortem examination is only to ascertain the cause of death. This article deals with the purpose of the inquest and roles of the medico-legal autopsy.

Key words: Inquest, medico-legal autopsy

INTRODUCTION

All deaths due to unnatural causes and deaths that are believed to be due to natural causes but where the medical cause of death is not certain or known are subjected to an inquest. An inquest is a preliminary inquiry and its objective is to ascertain facts pertaining to the death. This is achieved by inquiry and at the conclusion of the inquest a verdict is arrived as to whether the death was due to a natural, accidental, suicidal or a homicidal cause. An inquest is not a trial. There is no complainant or defendant and at the conclusion of the inquest no judgment is passed. In the English legal system, the person who conducts an inquest is called a Coroner. When a death is of public interest or concern, the Coroner may sit with a jury.

The Coroner system is one of the oldest offices in England. Many countries and colonies that were historically associated with England adopted the Coroner's system of inquiry into deaths. Over the years modifications have occurred and in the United States of America for example, presently many states use the Medical Examiner system. Most continental European

countries and their former colonies follow the Code Napoleon. The Procurator Fiscal system that is followed in Scotland is somewhat similar to the Continental system. While the Coroner system is a more elaborate system of inquiring into sudden deaths, the Continental and the Procurator Fiscal systems are more concerned with excluding the element of criminality in sudden deaths.

A postmortem examination may become necessary in certain deaths that come up for inquests. In these situations the authority which conducts the inquest will order a doctor to perform a medico-legal autopsy. In such a circumstance, consent from the relatives of the deceased is not required.

Though the systems may vary from country to country, their basic objectives to a large extent remain the same. In Malaysia, a modified version of the English Coroner's system exists. Here the Magistrate plays the role of the Coroner. In sudden, unnatural and violent deaths the police institute the inquest and also executes the power to order a postmortem examination by issuing the form Police 61. Because Malaysia

has a predominantly Muslim population, there is some objection to the medico-legal autopsy on religious grounds.' Besides that, there is also confusion in the minds of many as to the objectives of a medico-legal autopsy. In an unexpected sudden death, only a doctor after a postmortem examination may be able to determine the medical cause of death. It may be due to a natural disease, poisoning, accident or even a cleverly executed murder without any visible signs. It is very unfortunate that many believe that the autopsy is performed only to ascertain the cause of death and therefore, if the cause of death is known then there is no need for an autopsy. However, there are many reasons for performing a medico-legal autopsy and this aspect is discussed in this paper.

THE INQUEST

In Malaysia, deaths occurring under circumstances covered under chapter XXXII of the Criminal Procedure Code of Malaysia² are subjected to an inquest. An inquest is a preliminary inquiry into unexpected, unnatural and sudden deaths which is conducted by a Coroner or a Magistrate. The inquest system exists in all parts of the world. Even though there are variations in the procedure from country to country, the basic objectives remain the same.' The fundamental objectives of an inquest are to ascertain the identity of the dead person, the date and time of death, the place where the death had occurred and the cause and manner of death. The answers to these questions are obtained from inquiry and at times, through postmortem examination (autopsy). Lay people are often confused about the inquest, and they presume wrongly that all cases that are subjected to an inquest will result in an autopsy.

Unnatural deaths such as road accidents and murders which are subjected to inquests will invariably end up with an autopsy. However, in other sudden and unexpected deaths, bodies may be released without autopsy but after an inquest, if there are sufficient evidence to satisfy the Coroner or the Magistrate on the cause, manner and circumstances of death.

Deaths occurring under the following circumstances are subjected to an inquest⁴:

1. All unnatural and suspected unnatural deaths, e.g. murders, all types of accidents and suicides;
2. Deaths apparently from natural causes but where the exact medical cause of death is not known;

3. Deaths following anaesthesia, surgery or any medical investigative procedure;
4. Deaths in custody such as in police custody, remand prison, prisons, rehabilitation centres, detention camps, etc.
5. Deaths in mental institutions, asylums, etc.
6. Deaths associated with pregnancy, abortion, childbirth etc.
7. Deaths related to occupational diseases.

The inquest system, as mentioned earlier vary from country to country depending on the respective country's needs and expectations. In Scotland and Europe, for example, the main objective is to exclude the element of criminality.⁵ In England and Wales, it is to maintain an accurate statistics of all sudden deaths and hence the autopsy rates are high.⁴ In the Islamic world, however, due to religious reasons, there is a general resistance to autopsies.' The autopsy is really a necessary evil.

THE MEDICO-LEGAL AUTOPSY

There is no clear idea in the minds of many, including professionals such as lawyers, doctors and police officers, as to the objective of a medico-legal autopsy. The general belief is that a postmortem examination is conducted to ascertain the cause of death only. Thus, when a person dies of a head injury following a vehicular accident, a question is often raised as to the need for an autopsy, as the cause of death is already known. The fact is that in quite a number of medico-legal postmortem examinations, the cause of death is already known. It is mostly in natural sudden deaths where the cause of death is usually not known or not certain prior to autopsy.

A pathologist who conducts a medico-legal postmortem examination aims at the following, besides ascertaining or confirming the cause of death:⁶

1. Identifying the deceased;
2. Documenting the injuries, their description, nature and distribution;
3. Ascertaining whether the injuries and their distribution are consistent with a given history;
4. Reconstructing the event of death when a proper eye witness account or a history is not available;
5. Deciding whether to accept or refute an eye witness account;
6. Discovering any other underlying cause or disease that has contributed to the death;

7. Ascertaining the possibility of any voluntary act that the deceased may have performed after sustaining the injury;
8. Ascertaining whether the injuries found were inflicted before or after death;
9. Collecting trace materials on the victim which may help to solve a crime such as tracing a hit and run vehicle, arresting a rapist murderer etc.

SOCIAL BENEFITS OF AUTOPSIES

The wealth of knowledge acquired in the course of postmortem investigations not only contributes towards a more accurate database of all forms of mortality but also towards the introduction of measures to prevent them or to reduce their incidence. Many safety devices that are in use today such as seat belts, high back seats with head rests, crash helmets and so on are the result of these examinations. Innovations in automobile designs such as the laminated windscreen, padded dashboard, collapsible steering column, anti-burst doors, buried door handles, all have basis in these studies. Postmortem examinations of victims of bums and other forms of home accidents have contributed greatly towards designing safer buildings. Accurate statistics of disease patterns and deaths help to formulate a more effective and efficient health care system. Equally important are the investigations of crimes which not only help to apprehend the criminals but may also serve to protect the innocent who have been wrongly implicated.

RESOLVING MEDICO-LEGAL ISSUES

Pathologists are well aware of minor trauma sometimes leading to death either immediately or shortly after. Careful examination of such cases may reveal some other underlying conditions, such as an existing disease or a vascular abnormality that had contributed to or aggravated the death. A punch on the front of the chest may kill a person who is suffering from advanced coronary artery disease, and this can only be established by a postmortem examination. It is a well established fact that alcohol and drugs have not only contributed to all types of accidents but even to death. A body lying on a rail tract or a highway with injuries does not necessarily mean that the victim had died of an accident.⁷ A body found burnt inside a building does not always mean that the death was due to bums."

The following example illustrates the need

for a postmortem examination in road accidents. A private bus crashed into a tree in the night. The occupants consisted of the driver, conductor and a few passengers. The conductor died as a result of the accident while the others survived. At autopsy, the distribution and pattern of injuries found on the conductor suggested that he was actually driving the vehicle, and without a seat belt as well. In addition he had alcohol in his blood, which was above the legal limit. On the other hand, the injuries found on the driver who survived were that of an unrestrained front seat passenger. It became evident that the actual person who drove the bus at the time of the accident was the conductor. A cover up story had been made by interested parties because the conductor, who actually drove the bus, not only did not possess a driving license but had consumed alcohol. These facts when made known would naturally interfere with the insurance payment. The fact that a seat belt was not used also result in reduced insurance payment as it could be considered as contributory negligence.

MASS DISASTER MANAGEMENT

Mass disaster management and investigation is another important area that needs consideration. Grieved relatives and friends often complain when there is delay in releasing the bodies of victims to them. They even wonder why a postmortem examination is needed when it was obvious that the victims have died in the disaster, for example following an airplane crash. They may not appreciate that a methodical and systematic postmortem examination of the victims form an important part of the overall investigation of the crash. There are civil and criminal implications involved.⁹ The protocol for civil aircraft disaster investigation is clearly laid down in the memorandum on the investigation of civil air accidents by the Accidents Investigation Branch of the Department of Transport, United Kingdom.¹⁰

The International Civil Aviation Organization (ICAO) Convention, to which Malaysia is a signatory, defines what an aircraft accident is and how it should be investigated. The fundamental purpose of the investigation is to determine what happened, how it happened and why it happened. In addition, the investigation should be geared towards determining the facts, conditions and circumstances pertaining to survival or non-survival of the occupants and the crash worthiness of the aircraft. Prevention

and control of interior fire in air crafts is an area where a lot of research has taken place." In a 20-year study in the USA, out of 43 impact survivable accidents, 414 of the 978 fatalities probably died as a result of fire. This, in fact is the general trend seen all over the world. In the 1995 Sabah air crash too, most fatalities appeared to have occurred due to post impact fire. The injury details due to the crash, deaths purely due to fire, the advantage and disadvantage of various safety devices in the craft, what prevented the able passengers from getting out of the craft quickly, are matters that need careful consideration.¹² Careful and methodical postmortem examinations on all the victims in an organised manner contribute towards **finding** the answers. Since air crashes are matters of serious national and international concern, all possible resources should be mobilised and utilised, going beyond the usual protocols and red tapes. Outcome including financial liability arising from the results of these investigations have international implications.

Identification of the victims is another important aspect of the medical examination. If the victims are badly burnt or the bodies mangled up, visual identification becomes impossible. Then the pathologist has to resort to various other scientific methods to establish the identity of the victims. Correct identification of the victims have moral, ethical, civil and criminal implications. It is a moral duty that the correct bodies are handed over to the relatives for the last rites. If the victims are not identified, then death cannot be certified and hence insurance claims, transfer of estates etc. cannot be effected. Identification of the crew, especially the pilot and the co-pilot, is important in deciding the fact of pilot error for the crash. It is known, from studies in India and the UK, that over 50% of all cases of fatal aircraft accidents can be attributed to "pilot error". Careful autopsy of the pilot is therefore important to exclude natural diseases, alcohol, drugs or poisoning as the cause for the accident.^{13,14} Bullet wounds or explosive injuries on the body, which may not be visible externally owing to charring, can be detected at autopsy and during whole body X-ray. Similarly, the passengers too may show evidence of firearm or explosive injuries which will indicate sabotage. This may alert the international crime fighting agencies. Injury distribution patterns on the victims will help, in the event of an explosion, to determine the nature of the explosive and its location in the aircraft. The investigation may

reveal an odd person in the flight, perhaps with forged documents, who may be the culprit responsible for the tragedy. When more than one family member is involved in the tragedy, then the question of survivability (Commorientes) may arise which becomes important for the inheritance of property etc. There have been instances where insurance claims have been paid out wrongly for persons who were erroneously identified as amongst those dead in a disaster!

To summarise, the important objectives of a pathological investigation in an air crash are:

1. To assist the Investigation Board to establish the primary cause of the accident and the human factors of the accident;
2. To establish the modes of death, which also includes the survivability of crew and passengers, after impact;
3. To establish the suddenness of the emergency;
4. To distinguish specific injuries whether post or antemortem due to explosion or engine products, and their correlation to cockpit ergonomics and aircraft forces, etc.;
5. To evaluate safety equipment and aircraft ergonomics;
6. To assist in medico-legal and sociological matters such as identification of remains, time of death and commorientes;
7. To gather all possible information on the background of flight deck crew, which may have played a causative or contributory role in the accident by impairing function and efficiency.

In many countries, a group of pathologists and psychologists with experience in Aviation Medicine are assigned to assist in the aeromedical and human factors aspect of aircraft accident investigations. In Britain, this is done by the RAF Institute of Aviation Pathology in Halton in association with the RAF Institute of Aviation Medicine, Farnborough. In the United States, it is done by the Armed Forces Institute of Pathology in Washington and the Civil Aeromedical Institute, Oaklahoma. In India it is undertaken by the IAF Institute of Aviation Medicine in Bangalore.

This article attempts to enlighten the painful reality of performing medico-legal postmortem examinations. Hopefully it clarifies some of the misconceptions regarding postmortem examinations. Air crash investigation is dealt with in more detail because of its greater public interest.

REFERENCES

1. Boglioli LR, Taff ML. Religious objection to autopsy. An ethical dilemma for Medical Examiners. *Am J Forensic Med Pathol* 1990;11(1):1-8.
2. Criminal Procedure Code of Malaysia 1993. Chapter XXXII, Sections 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340.
3. Mimi Kamariah Majid. *Inquiries of Death*. University of Malaya, 1995.
4. Knight BH. *The Coroner's Autopsy*. Churchill Livingstone, 1983; 2-42.
5. Knight BH. The development of medico-legal system. In: A.Keith Mant, ed: *Taylor's Principles and Practice of Medical Jurisprudence*. Churchill Livingstone, 1984: 1-14.
6. Knight BH. *The Forensic Autopsy*. In: *Forensic Pathology*. Edward Arnold, 1995: 1-46.
7. Raekallio J. Application of histochemical methods to the study of traffic accidents. *Acta Med leg soc(Leige)* 1967; 20:171-8.
8. Noguchi TT, John JE, Klaff EC. Significance of Cyanide in Medico-legal Investigations Involving Fires. *Am J Forensic Med Pathol* 1988; 9(4):304-9.
9. Cullen SA, Turk EP. The value of post mortem examination of passengers in fatal aviation accidents. *Aviation, Space and Environmental Medicine* 1980 ;51:1071.
10. Accidents Investigation Branch, Department of Transport, United Kingdom 1984. Memorandum on the investigation of civil air accidents.
11. Gavaghan H. Aircraft fires: Living through the smoke. *New Scientist* 1987; 54-57.
12. Samuels A. The Manchester Airport Disaster. *Med Sci Law* 1987; 27(2):118-9.
13. Billings CE, Wick RL, Cerke RJ, Chase RC. Effects of ethyl alcohol on pilot performance. *Aerospace Medicine* 1973; 44:379.
14. Underwood Ground KE. Alcohol associated with fatal light aircraft accidents in the United Kingdom. *Aviation, Space and Environmental Medicine* 1975; 46:1275.