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November 2001

### Autopsy

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Lawrence, Susan C., "Autopsy" (2001). *Faculty Publications, Department of History*. 34.  
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# Autopsy

In a moment made familiar by television dramas and films, a detective views a dead body, turns to the doctor examining the corpse, and asks for the cause of death. The doctor inevitably remarks, “Ah, we’ll have to wait for the autopsy to be sure.” An autopsy is a standardized biomedical procedure during which trained medical pathologists examine the exterior of the body, dissect the corpse, view the vital organs for any obvious abnormality and weigh them, and collect specimens of tissues and fluids for further analysis. The procedure takes 2–4 hours and ends with the body being prepared either for storage until it can be released, or to go to the undertaker for embalming and burial or cremation. After additional laboratory work on the tissues and fluid specimens to detect the presence of drugs and/or co-existing medical conditions, the pathologist forms an opinion on the cause of death.

A typical autopsy begins with a Y-shaped incision from each shoulder to the lower end of the sternum and in a single incision from there to the pubic bone. The pathologist retracts the skin and superficial muscles from the chest and abdomen, and cuts the cartilages holding the ribs to the sternum, which is then removed. The pathologist removes, weighs and inspects the heart and lungs, often taking a sample of blood from the heart; the abdominal organs are also inspected, removed, and weighed, taking fluid samples as appropriate. The skull is opened by making an incision through the scalp on the back of the head and detaching it from the bone to lie over the face. The skull is then cut through with a bone saw, the bone removed and the brain extracted. Throughout these steps (which can occur in a different order) the pathologist removes sections of tissues to be preserved, with particular attention to those that appear diseased or injured. Photographs may be taken of parts of the body or of organs still in place or after removal. The flaps from the Y-incision are laid back over the thorax and abdomen and loosely sutured; the removed section of skull is replaced and the skin drawn back, which usually means that the face may be viewed during the funeral.

There are two basic kinds of autopsy: the *forensic autopsy* and the *medical autopsy*. A forensic autopsy, as the name implies, is one performed to satisfy the law. In

most Western nations, an autopsy must be performed if a person died in suspicious circumstances, was unexpectedly found dead, died without having recently seen a physician who can attest to a cause of natural death, or is suspected of having had a disease that possibly threatens the public’s health. In these circumstances, the state requires an autopsy and does not need permission from the deceased’s relatives to perform one. If MURDER is suspected, the autopsy is required to establish the cause of death, to determine if the findings support the suspected crime, and to provide as much evidence as possible about how, when, and where such a crime might have occurred.

The medical autopsy has different goals. In these cases, physicians are already satisfied that the person died a natural death. Pathologists then use the autopsy to investigate the details of that natural death. Sometimes they seek additional information about the treatment that the patient had received, such as internal healing after a surgical procedure or evidence of a response to medications, even if these had nothing directly to do with the death. The medical autopsy also serves researchers studying a disease process such as cancer or bone deterioration, and who need specimens from a patient for whom they have a clinical record. Most medical autopsies require the consent of the immediate family, which normally includes permission for the pathologists to take and to preserve organs and specimens of use to medical science.

The word “autopsy” comes from the Greek terms meaning “seeing (or seen) for oneself.” The medical and legal use of “autopsy” to mean anatomical dissection to discover the cause of death carries with it that sense of personal inspection and, when necessary, personal testimony, in court or at a case conference about what the observer saw within the body. “*Postmortem*” (Latin: “after death”) is often used as a synonym for “autopsy,” but post-mortem examination is actually a general term for inspection of a corpse that does not necessarily include dissection.

## History and cultural issues

Most cultures have historically had a strong aversion to mutilating the dead human body or to dissecting it

simply to learn normal anatomy. Yet the world's ancient and classical civilizations had equally strong prohibitions against murder. In India, in China, and around the Mediterranean, the ruling orders developed legal systems that defined murder and established procedures in which witnesses testified that external marks on the body, or other visible signs, distinguished suicides, accidental deaths, and natural deaths from murder. In medieval Europe, twelfth-century legal scholars first extended the common practice of viewing the external signs on a body to identify probable cause of death, to examining the *internal* marks of violence or disease. The question of which wound corresponded to the fatal blow, for instance, could be crucial for picking out the murderer from those involved in a group assault. Poison, too, was thought to leave visible marks in the stomach that an expert might identify. Opening the body to serve justice thus outweighed distaste for such procedures. Early autopsies were likely to be quite short and minimally defacing because the inspection was limited to the area of the thorax or abdomen under particular scrutiny. The history of the autopsy in Western Europe and Great Britain is thus closely tied to the evolution of legal systems and court procedures. In English (and later American) law, the development of the duties of the coroner, a lay person, kept the decision to order a medical inspection, whether external or internal, out of the hands of medical experts until the nineteenth century.

Forensic autopsy procedures antedated the introduction of lawful human dissection into medical schools, which first emerged in medieval universities in the early fourteenth century. It is important to distinguish autopsies, where legal officials sought the cause of death, from anatomical dissections, where anatomists and, much later, medical students, learned normal anatomy. The former had a legal purpose; the latter only seemed to satisfy human curiosity. When dissection was introduced into universities and surgical guilds throughout the late medieval and early modern periods, secular rulers only permitted dissections of executed criminals. The continued association of dissection with mutilation and post-mortem punishment helped to maintain cultural aversion to autopsies.

Medical autopsies, where the body is opened simply to determine the cause of a natural death, emerged in Europe only after the rise of the study of normal anatomy in the sixteenth century. Even then, physicians and elite surgeons performed such inspections only sporadically until the eighteenth century, primarily because the dominant theory of the humors, which explained both health and disease in terms of individualized balances of the body's main fluids, accounted for the visible marks of pathology on organs as being the

effects of underlying disease imbalances. Such hidden signs, usually inaccessible to the physician, were not considered particularly useful for understanding or treating disease in the living. In the eighteenth century, however, especially with the publication of Giovanni Battista Morgagni's *De sedibus et causis morborum per anatomen indagatis* (1761), practitioners began to investigate more thoroughly the internal changes associated with diseases, and by the end of the century the study of morbid anatomy was well under way. The early to mid-nineteenth century witnessed extensive correlations between the anatomical changes observed at autopsy and the clinical course of diseases in previously living patients, particularly in the bodies of the poor dying in hospitals. With improvements in the microscope, moreover, the enthusiasm for gross pathology shifted to the pathology of tissues and cells, which dominated research in the second half of the nineteenth and well into the twentieth centuries. At the same time, the emergence of biochemistry added chemical investigation of human fluids and tissues to the pathologist's ability to detect both the signs of medical disorders and, eventually, the presence of alcohol and other drugs in a corpse.

Most inhabitants of the industrialized West now see autopsy as a necessary legal and medical protocol. For others, however, an autopsy represents a violation of the spiritual integrity of the recently dead human being. Traditional Hindus prohibit autopsies; Islamic law forbids mutilation of the corpse. While Islamic jurists have long argued that this prohibition does not apply to respectful legal and medical procedures necessary to determine a cause of death, Qur'anic statements about the resurrection of the physical body influence cultural resistance to the procedure. Similarly, modern arguments that humans have ethical obligations to protect life by increasing medical knowledge, and to ensure that justice is done by gathering evidence about crimes, have eased, but not necessarily eliminated, the antagonism towards autopsies held by Orthodox Jews and traditional Christians. As important as autopsies are in the abstract for law and medicine, they will continue to carry important cultural and emotional meanings as humans face the deaths of relatives and friends.

Susan Lawrence

#### Further reading

Forbes, T. R. (1985). *Surgeons at the Bailey: English forensic medicine to 1878*. Yale University Press, New Haven.

*Encyclopedia of Bioethics* (1995). Macmillan, New York.

See also ANATOMY; DEATH; DISSECTION; MURDER.