



Autopsy and the Quality of Care

Autopsy has contributed significantly to the development of medicine by providing the means for the discovery and description of new disorders and syndromes. In this, its *scientific role*, the autopsy was most effective in the 19th and the first half of the 20th century. It generated a wealth of information fundamental to the understanding of disease and to the construction of modern disease nosology on the basis of observed symptoms, signs, and postmortem lesions. As new pathological conditions emerge, such as acquired immunodeficiency syndrome (AIDS), legionellosis, and severe acute respiratory syndrome (SARS), the discovery and nosology-building role of the autopsy remains irreplaceable even though new investigative tools have become available. Its scope, however, is narrower than in the era in which it represented the primary tool of scientifically based medicine.

Another function of autopsy, which has been increasingly important in the second half of the 20th century and today, is its *diagnostic role*. The accuracy of death certificates and different registries, as well as the verification of clinical diagnostics depend on this function of the autopsy. Closely related to this is the way in which autopsies contribute to epidemiological studies. Literature repeatedly points to a discrepancy between clinical observation and autopsy findings, and the autopsy, mainly through this diagnostic role, fulfills an important task in activities improving the quality of care by revealing diagnostic errors.

Autopsy can be used in quality of care improvement activities on two levels: individual and collective. On the individual level, postmortem examination helps the clinician understand signs and symptoms of a specific case and thus improve his or her practice. On the collective level, the analysis of a large number of autopsies can expose errors in the clinical diagnostic process and initiate the correction of such mistakes. The first study regarding this level was published in 1912 by Richard Cabot from Boston, who discovered "a humiliating proportion of clinical diagnoses to be incorrect at autopsy" (1). This eye-opening exercise was repeated several times, notably in 1957 by Gruver and Freis who, for the first time, courageously pinned the blame for the errors on the attending physicians (2). In 1974, Mona Britton in Stockholm published the first prospective controlled study and reported 7.3% discrepancies (ie, cases in which the major diagnosis was wrong), but also pointed out that an additional 13% of patients died

without a diagnosis (3). Hartveit in Bergen (4) and Cameron and McGoogan in Edinburgh (5,6) confirmed and amplified Britton's study. Goldman and associates (7) in the US detailed the course of discrepancy rates over three decades. Since then, many related studies have appeared from all over the world, including an analysis of 50,000 published autopsy cases over five decades (8). The latter study differentiated between diseases in which clinical diagnosis showed improvement over the years (e.g., rheumatic heart disease and leukemia), worsened (tuberculosis and carcinoma of liver) or remained unchanged (acute myocardial infarction and cirrhosis of liver). A drawback of this analysis, however, is that conclusions were valid only for the autopsied population. All mentioned studies showed a fairly constant discrepancy between major clinical and postmortem diagnoses in the range of 12% to 34%. The main difference between various periods was the changing list of wrongly diagnosed diseases, suggesting that the autopsy has taught us a lessons. Findings also indicate that medical diagnoses have an inherent, integrated erroneous component, which is fairly constant during different periods of time, probably as the consequence of imperfect medical knowledge and inevitable fallibility (8). Thus, these studies indicated that clinical diagnostics, the basic technique used by clinicians in approaching a patient, might have serious flaws: among patients who died and were autopsied, 12% to 34% were wrongly diagnosed and might have been helped had the correct diagnosis been made.

However, these studies simply verify the existence of a substantial rate of diagnostic discrepancy. Little has emerged that is directed at improving the accuracy of clinical diagnostics and consequently, the quality of medical care. In other words, the autopsy was merely an instrument of assessment, not aimed at improvement of clinical diagnostics and subsequently, the quality of care.

Autopsy findings from a representative sample of deaths in a hospital provide an opportunity for a regular and systematic revision of clinical diagnosis and treatment to induce their improvement. Toward this end, a standardized analysis of the collected results would furnish useful data for comparison and follow-up and thus enable improvement of the quality of medical care. Hill and Anderson (9) proposed a model for a systematic assessment of the quality of clinical diagnostics, aiming at its improvement. In

their model, the entire experience of a hospital is studied. In all cases in which a specific diagnosis has been made at autopsy, the premortem and postmortem diagnoses are compared and discrepancies in diagnosis evaluated as to the cause and magnitude, with sensitivity and specificity determined for all major discrepancies. If the experience that a hospital is not within the acceptable range of sensitivity and specificity (determined prospectively for that disease), the experience is considered unsatisfactory and intervention is required. Four categories of causes of diagnostic error are recognized, as follows: 1) those due to imperfect medical knowledge (unavoidable, resulting from limitations in contemporary capability); 2) those due to unavoidable fallibility (derived from patient, physician, and environmental variables); 3) those due to practitioner error (avoidable, derived from personal limitation of knowledge and skill); and 4) those due to willful or malicious error (avoidable, caused by negligent or willful disregard). The magnitude of the error is divided into two classes, major (errors that contributed or might have contributed to the death) and minor (not relevant to the outcome). The model recognizes that there are unavoidable and therefore acceptable diagnostic errors, and its control levels are prospectively established based on current medical practice. It does not make value judgments or place blame on a single case, but rather aims at detecting signals of clinical diagnostics in a hospital (or a department within it) not being satisfactory. The model focuses on diagnostics of individual diseases rather than on the entire spectrum of medical practice. Considerable work must precede its implementation but it would not be difficult to apply it in many hospitals where autopsy rate is high and data handling systems are available. An adequate autopsy rate of 35% has been suggested, without specifying the acceptable proportions of clinical and medicolegal autopsies within the overall total (10). Another model is proposed by Saracci (11), who maintains that an accurate assessment of clinical diagnoses can be obtained through clinico-pathological surveys. These entail accurate pathological examination and validity of study design and analysis, and require estimates of sensitivity and specificity of the clinical diagnosis using the autopsy diagnosis as a yardstick.

In spite of all new sophisticated investigative tools and diagnostic techniques, the percentage of agreement between clinical diagnoses and those of autopsies ranges from 66% to 88%, indicating a persistently unsatisfactory level of accuracy of the former. Therefore, autopsy cannot be regarded outdated and unnecessary and the need for autopsy verification remains unchanged. Sharp decrease in the frequency

of performed autopsies, observed in most countries from which pertinent data are available, should be regarded a serious threat to the evaluation and control of clinical diagnostics, jeopardizing the attainment and maintenance of high quality medical education and medical care. Efforts must be made to reverse the trend.

Autopsy is not an instrument for assessing the overall quality of medical care. It focuses on assessing the accuracy of the clinical diagnosis of patients who died and provides a yardstick against which the clinical diagnosis of these patients can be measured. Thus, although the scope of an autopsy as an assessment tool is limited, it is a key instrument. Whenever quality improvement activities and programs are implemented in a hospital, autopsy should be given its natural place.

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References

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