Autopsy Result Utilization
A College of American Pathologists Q-Probes Study of 256 Laboratories

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Objectives.—To document the level of involvement and communication with nonpathology clinical personnel regarding autopsies and to document the destination of autopsy reports.

Design.—The College of American Pathologists Q-Probes format was used to collect information on 15 consecutively performed autopsies per institution or for 6 months, whichever occurred first. The following information was recorded for each autopsy: decedent’s age, hospital service, length of hospital stay, whether organs were donated, who was present at autopsy, methods of communicating preliminary and final autopsy results, special techniques used to arrive at a preliminary diagnosis, activities for which the autopsy was used, and destination of final report.

Participants.—Two hundred fifty-six laboratories collected information on 2755 autopsies.

Results.—The aggregate autopsy rate was 12.4% (median 8.5%). Nonpathology clinical personnel attended 35.8% of all autopsies. A clinical physician was more likely to attend an autopsy if the patient was from a surgical service. Three primary methods were used to communicate preliminary autopsy results, namely, written reports (82.5%), telephone calls (50.6%), and meetings (11.5%). The primary care physician was sent the autopsy report in 91.1% of cases. Approximately half of the autopsy cases were used in both pathology departmental and extradepartmental activities. Aggregate autopsy data were distributed in the majority of cases to various departmental chairpersons and institutional quality assurance committees.

Conclusions.—This study provides a comparative multiinstitutional database for the utilization of autopsy results by clinicians and clinical departments. Although autopsy rates are low, autopsy results are routinely being used for hospital quality assurance activities and for educational purposes.

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While enthusiasm for the autopsy has declined during the past several decades, current experience confirms the autopsy as one of the best medical teaching and quality assurance tools available.1–6 In an ideal world, every death would result in an autopsy, and the findings would be thoroughly discussed with the primary physician. Furthermore, conferences would be held for selected cases so that many more physicians would benefit from postmortem findings. Unfortunately, most hospitals struggle to maintain an autopsy rate of 10%7,8 and it is not clear where autopsy information is directed or how it is used.

Numerous recent studies have shown that up to 40% of autopsies demonstrate significant findings that were not known clinically.2,9–12 If this information is to be of any benefit, it must be circulated, discussed, and analyzed. While studies have used autopsy material to define disease processes, there has been little focus on the routine daily use of autopsy information. The College of American Pathologists Q-Probes program has attempted to systematically study all aspects of the autopsy as a quality assurance tool. Past studies have measured preliminary and final timeliness of reporting, report adequacy, and clinical pathologic diagnostic correlation.12–14 In this study, we collected data to identify where autopsy information is directed. While it may be idealistic to expect that every autopsy is of benefit to the physician, the family, medicine in general, or to the public, an assessment of how autopsy information is distributed is basic to improving and fulfilling the autopsy’s promise.

Materials and Methods

Two hundred fifty-six pathology departments enrolled in the College of American Pathologists voluntary Q-Probes quality improvement program participated in this study. The Q-Probes format for data collection and handling has been described previously.15 In this study participants were asked to collect information on 15 consecutive autopsies or for 6 months, whichever occurred first. The following information was recorded for each autopsy: decedent’s age, hospital service, length of hospital stay, whether organs were donated, who was present at autopsy, methods of communicating preliminary and final autopsy results to clinical physicians and to the decedent’s family, special techniques used to arrive at a preliminary diagnosis, interdepartmental and intradepartmental activities for which the autopsy results were used, and the destination(s) of final autopsy reports.

Participants were also queried regarding hospital demographic data and autopsy practices. This information included the destination of aggregate autopsy data, whether unexpected autopsy findings were routinely classified based on clinical significance, whether an on-site autopsy facility was present, and whether autopsy reports were available on a hospital-wide computerized system.

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Table 1. The Number of Deaths, Number of Autopsies, and Autopsy Rates at Participating Institutions

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>10th Percentile</th>
<th>25th Percentile</th>
<th>Median</th>
<th>75th Percentile</th>
<th>90th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of deaths</td>
<td>492</td>
<td>161</td>
<td>275</td>
<td>410</td>
<td>630</td>
<td>950</td>
</tr>
<tr>
<td>No. of autopsies</td>
<td>59</td>
<td>8</td>
<td>16</td>
<td>31</td>
<td>72</td>
<td>132</td>
</tr>
<tr>
<td>Autopsy rate, %</td>
<td>12.4</td>
<td>2.9</td>
<td>4.5</td>
<td>8.5</td>
<td>13.5</td>
<td>29.9</td>
</tr>
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</table>

RESULTS

Of the 256 participating laboratories, 88% were accredited by the College of American Pathologists and 81% were accredited by the Joint Commission for Accreditation of Healthcare Organizations. The majority of institutions (94.5%) had autopsy facilities located on-site, 49% were American Council for Graduate Medical Education-accredited teaching institutions, 75% were private hospitals (66% not for profit), and 25% were governmental hospitals. Seventy-six percent were city hospitals; 15%, suburban; 8%, rural; and 1%, other. The average occupied bed sizes were 151–300 (41%), 301–450 (20.6%), 1–150 (19.4%), >600 (10.1%), and 451–600 (8.5%).

A total of 120,436 yearly deaths occurred in these participating institutions, and a total of 14,956 autopsies were performed for an aggregate autopsy rate of 12.4%. Table 1 shows the distribution of the number of deaths, autopsies, and autopsy rates at individual institutions.

Participants collected data on 2,755 autopsy cases. The median number of cases submitted per institution was 13. Thirty-eight percent of institutions collected data on 15 autopsy cases. Figure 1 shows the length of the patients’ hospital stay prior to death. Nearly 60% of cases had a hospital stay of 5 days or less. Figure 2 shows the clinical services from which the autopsy cases were derived. Participants reported that 4.8% of decedents were organ tissue donors and 41% were eye donors.

Figure 3 lists the individuals, other than the pathologist, who were present at autopsies. Nonpathology clinical personnel attended 35.8% of all autopsy cases. A morgue attendant was more likely to be present at autopsies in teaching hospitals (P = .001) and institutions with pathology residencies (P = .003). Clinical physicians were more likely to attend an autopsy if that patient came from a surgical service (P = .013).

In 81% of cases no special technique was used to aid in the diagnosis. Teaching institutions (P = .039) and institutions with pathology residency programs (P = .017) used special techniques to enhance their preliminary reports more frequently than others. Table 2 shows the extent to which special techniques were used. In 40% of institutions, autopsy findings were classified based on a defined system of clinical correlation. In 25.6% of institutions, autopsy reports were available in a hospital-wide computerized system. In most institutions, aggregate autopsy data routinely were reported to a pathology department chairperson and institutional quality assurance committee. Figure 4 shows the distribution of aggregate autopsy data.

Three primary methods were used to communicate preliminary autopsy findings to physicians, namely, written reports (82.5%), telephone calls (50.6%), and meetings (11.5%). Other modalities were infrequently used eg, e-mail, 1.4%, and fax, 1.0%. No communication of preliminary results occurred in 3.4% of cases.

Final autopsy reports were sent to many locations, as shown in Figure 5. The primary care physician received the report in 91.1% of cases. Nearly half (49.1%) of autopsy cases in this study were used for one or more activities within the pathology department, including review of gross findings (31.3%), dissection and review of the brain (20.4%), correlation with previous surgical or cytology material (15.6%), or presentation of the complete case (15.0%); 50.9% of cases were not used for any activity within pathology.

Table 3 shows how autopsy information was used in
The goals of this Q-Probes study were to document the level of involvement and communication with nonpathology personnel regarding autopsies and to document the destination of autopsy reports. We also examined the use of autopsies at conferences as a reflection of their educational benefit.

Nearly 36% of all autopsies in this study were attended by individuals from outside the pathology department. These individuals included clinical physicians, medical housestaff, medical students, and nurses or nursing students. In the past, the autopsy was part of medical rounds and constituted a significant proportion of medical students' education. Anderson et al stated that in the 1950s more than 50% of patients dying in US hospitals were autopsied, and nearly 100% of autopsies were attended by

interdepartmental activities. Slightly more than half of the cases (52.1%) were not used in any interdepartmental activity.

**COMMENT**

The autopsy was perhaps the single most important medical procedure used by medical pioneers to facilitate the discovery, description, and understanding of disease processes. While institutions are still expected to perform autopsies on a certain percentage of deaths occurring within the hospital, this percentage has steadily declined to roughly 10% of deaths occurring in hospitals in the United States. In this study, participants had an aggregate autopsy rate of 12.4% and an institutional median rate of 8.5%, reflecting the current state of the autopsy.

Table 2. Special Techniques Used to Enhance Preliminary Diagnosis

<table>
<thead>
<tr>
<th>Technique</th>
<th>Percentage of All Autopsies</th>
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</thead>
<tbody>
<tr>
<td>None</td>
<td>81</td>
</tr>
<tr>
<td>Next day tissue processing</td>
<td>7.3</td>
</tr>
<tr>
<td>Microbiology preparation or stain</td>
<td>6.0</td>
</tr>
<tr>
<td>Frozen section</td>
<td>2.4</td>
</tr>
<tr>
<td>Cytology preparation</td>
<td>0.8</td>
</tr>
<tr>
<td>Other</td>
<td>5.2</td>
</tr>
</tbody>
</table>

Figure 2. Distribution of autopsy cases by medical service.

Figure 3. The percentage of autopsy cases attended by various personnel.
Figure 4. The percentage of autopsy cases reported to various individuals or committees as aggregate data.

Figure 5. Destination of autopsy reports.
nonpathology personnel. This level of involvement has clearly diminished and many reasons for this decline have been proposed. The decline, however, is of greater magnitude than is readily apparent. For example, 30 years ago at our institution (Henry Ford Hospital), 500 to 1000 autopsies were performed annually. Today, we struggle to maintain a rate of 200 autopsies per year. In this study, 90% of all institutions performed fewer than 132 annual autopsies, with a median of 31. While slightly more than one third of current autopsies are being viewed by nonautopsies, with a median of 31. While slightly more than one third of current autopsies are being viewed by nonpathology clinical personnel, a dramatic decline in the number of autopsies has occurred and, therefore, the number of autopsies that are being viewed by nonpathology personnel is approximately 5% to 10% of what was experienced 20 to 30 years ago.

This decline, however, should not discourage us from welcoming physicians and students to attend autopsies. It has been our experience that those physicians who attend autopsies tend to repeat the experience, as it provides immediate feedback regarding correlation of clinical and pathologic findings. It is unquestionable that this type of feedback can be essential in improving physicians’ skills. Despite the emotional distress associated with the loss of a patient, the autopsy provides an opportunity for a physician to learn and improve. In this study, surgeons were more likely than other physicians to attend an autopsy of their patients. The reasons for this higher attendance are not clear; however, in our experience, patients on surgical services are more likely to have undergone procedures with potential risk of morbidity, resulting in questions of whether the procedure was successful and, if not, what may have been improved. Such outcome assessments of technical procedures are readily made by gross pathologic assessment and, therefore, surgeons are more likely than other physicians to obtain an immediate answer to their questions by attending an autopsy.

One of the primary objectives of this study was to determine how effective and direct the communication of information from pathologists to clinicians and to patients’ families was. While we could not precisely demonstrate the effectiveness of the information communicated, preliminary autopsy results appeared to be conveyed directly to physicians. Verbal communication occurred in slightly more than 50% of cases, and in 11.5% a face-to-face meeting actually occurred. In the majority of cases, a written autopsy report was delivered to the clinical physician.

Accrediting agencies require that autopsy information be used for quality assurance and education purposes. The Joint Commission on Accreditation of Health Care Organizations includes standard MS.6.3.1, which states: “Findings from autopsies are used as a source of clinical information in quality assessment and improvement activities.” The College of American Pathologists Laboratory Accreditation Program includes checklist items 08.3010, which ask the following questions: “Are the findings of postmortem examination used for correlated clinicopathological teaching purposes designed to enhance the quality of patient care?”, and 8.3015, “Are the findings from autopsies incorporated into the institutional quality improvement program?” In this study we were able to document that departmental and institutional quality assurance committees, as well as infection control officers, medical director offices, and risk management offices, all received autopsy reports. Although reports were distributed to each of these various locations, in 5% to 20% of cases we were unable to determine how this information was used, as this was not within the scope of this study. We believe that future studies should focus on the question of effective integration of autopsy information, as this may ultimately determine the autopsy’s current contribution to the field of medicine. Ideally, quality assurance committees can use this information to improve clinical practice.

Regarding the autopsy’s educational contribution, approximately 50% of cases were used for conferencing within both pathology and other disciplines. Again, considering the absolute number of autopsies performed, this level of use is far diminished from the past. Yet, the autopsy clearly has value as an educational tool, which could be exploited more fully. There are no studies to tell us what optimal number of autopsies should be used for education. We suspect this varies with the level of training and experience. Even the most senior pathologist, however, can learn from an autopsy; after all, the autopsy gives pathologists the opportunity to fully understand disease as one reviews the clinical history and writes the final medical chapter in a patient’s life. The autopsy is a comprehensive vehicle to confirm clinical impression, determine efficacy of treatment, and explain signs and symptoms of disease.

References

Table 3. Interdepartmental Activities for Which Final Autopsy Reports Were Used (N = 2674)

<table>
<thead>
<tr>
<th>Interdepartmental Activity</th>
<th>Percentage of All Autopsies</th>
</tr>
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<tbody>
<tr>
<td>Morbidity/mortality conference</td>
<td>29.3</td>
</tr>
<tr>
<td>Review of gross/preliminary findings</td>
<td>17.3</td>
</tr>
<tr>
<td>Presentation of complete case</td>
<td>12.0</td>
</tr>
<tr>
<td>Clinical/pathologic conference</td>
<td>10.5</td>
</tr>
<tr>
<td>Family death conference</td>
<td>1.8</td>
</tr>
<tr>
<td>Other</td>
<td>4.0</td>
</tr>
<tr>
<td>None of the above</td>
<td>52.1</td>
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