

Correlation between clinical and autopsy diagnoses in a community hospital

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Forty-six consecutive autopsies performed in 1 year on patients who died in a 120-bed urban community hospital were analysed with respect to clinical-pathological correlation. The mean age of the patients was 71 years. Errors in clinical diagnosis were assigned to one of four classes: class I, a missed major diagnosis, the detection of which before death would probably have changed management and resulted in longer survival or possible cure; class II, a major missed diagnosis that, if detected before death, would probably not have altered management; and classes III and IV, minor missed diagnoses. Six (13%) class I and 10 (22%) class II errors were found, as well as a number of class III and IV errors. Suggestions are made regarding the use of such data in audit procedures.

Quarante-six autopsies consécutives effectuées en 1 an sur des malades décédés dans un hôpital urbain de 120 lits ont été analysées dans l'optique de la corrélation anatomo-clinique. L'âge moyen était de 71 ans. Les erreurs de diagnostic clinique ont été classées en quatre catégories: la catégorie I, erreur grave de diagnostic dont la détection avant le décès se serait probablement traduite par un changement du traitement et une période de survie plus longue ou un rétablissement éventuel; la catégorie II, erreur grave de diagnostic dont la détection avant le décès n'aurait probablement pas signifié un changement de traitement; et les catégories III et IV, erreurs de diagnostic de peu d'importance. On a constaté six erreurs (13%) de catégorie I et 10 (22%) de catégorie II, ainsi qu'un certain nombre d'erreurs de catégories III et IV. On propose l'utilisation de telles données dans la revue critique de la qualité du travail médical.

Several recent studies have examined the accuracy of clinical diagnoses as measured against autopsy findings.¹⁻³ Most of the studies are from teaching hospitals. Major diagnoses of clinical relevance are missed in around 8% of cases.⁴

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I carried out a study to investigate the correlation between clinical and autopsy diagnoses in a small community hospital.

Methods

In 1983, 106 autopsies were performed at Concordia Hospital, Winnipeg. Of the 106 patients 27 had died outside the hospital, 33 had presented to the emergency department with cardiopulmonary arrest, and 46 had died in hospital, either on a ward or shortly after arriving at the emergency department. Only the last group was included in the study. All autopsy records for 1983 were examined, and the medical records of the 46 patients who had died in hospital were re-examined. In each case the major diagnoses (i.e., all principal underlying diseases and primary causes of death as entered in the patient's chart) were recorded. All other diagnoses were listed as minor diagnoses. Investigations other than "routine" laboratory tests were noted. Data were also obtained on surgery, biopsy, consultations, length of stay, previous admissions and visits to the emergency department and the office.

Errors in diagnosis were classified according to the system suggested by Goldman and colleagues.¹ A class I error is a missed major diagnosis, the detection of which before death would probably have changed management and resulted in longer survival or possible cure. A class II error is a missed major diagnosis that, if detected before death, would probably not have altered management. Included in the latter category are cases in which appropriate treatment was administered even though the correct diagnosis was unknown. Class III and IV errors are minor missed diagnoses.

Results

The average age of the patients was 71 (extremes 39 and 94) years. The average length of stay was 20 days (extremes 1 hour and 318 days). There were 25 women and 21 men. Of the 46 cases 41 were "medical" and 5 were "surgical".

Autopsy disclosed a class I error in 6 of the 46 cases (13%) (Table I). In patient 1 extensive investigations, including computed tomography (CT), had been done at another hospital for seizures that had developed 3 weeks before the patient died. She

presented to Concordia Hospital following a fainting spell at home and died within 1 hour of being seen in the emergency department. The autopsy

did not reveal any brain lesion, but multiple granulomas were found in other organs, including the lungs and liver. In one of the granulomas an

Table I—Demographic features and diagnoses in the six cases in which class I errors were found

Patient no./sex	Age (yr)	Duration of stay in hospital	Diagnosis	
			Clinical	At autopsy
1/F	39	1 h	Seizures	Miliary tuberculosis
2/M	59	3 d	Hematochezia Hematemesis	Aortoenteric fistula
3/M	77	43 d*	? Bleeding ulcer ? Malignant disease ? Vasculitis	Lymphoma
4/F	77	62 d	Dementia Seizures Hypertension Renal failure Hyperthyroidism	Chronic subdural hematoma
5/F	83	12 d	Duodenal ulcer Metastatic liver tumour	Perforated duodenal ulcer Carcinoma of the liver
6/M	67	44 d	Carcinoma of the pancreas	Carcinoma of the pancreas Massive intra-abdominal hemorrhage

*Three separate admissions over 6 months.

Table II—Demographic features and diagnoses in the 10 cases in which class II errors were found

Patient no./sex	Age (yr)	Duration of stay in hospital (d)	Diagnosis	
			Clinical	At autopsy
1/F	66	15	Carcinoma of the breast with metastases	Carcinoma of the breast with metastases Leukopenic enterocolitis Candidiasis Cirrhosis
2/M	66	12	Metastatic carcinoma	Carcinoma of the pancreas
3/M	77	4	? Carcinoma	Carcinoma of the pancreas
4/F	83	12	Carcinoma of the stomach	Primary carcinoma of the liver
5/F	66	1	Ischemic heart disease Chronic obstructive lung disease Pulmonary embolus	Carcinoma of the lung
6/M	77	318	Cardiomyopathy Carcinoma of the prostate Pneumonia	Cardiomyopathy Cerebrovascular accident
7/F	94	14	Ischemic heart disease Paget's disease of bone	Severe Paget's disease of bone Carcinoma of the lung with metastases
8/F	82	39	Ischemic heart disease Stokes-Adams disease Renal failure	Generalized amyloidosis
9/F	74	45	Pneumonia Adult respiratory distress syndrome	Pneumonia Ischemic heart disease Ischemic colitis
10/M	66	28	Chronic obstructive lung disease Cardiac failure Pneumonia	Pulmonary embolism and infarction

acid-fast bacterium was demonstrated by fluorescence microscopy. Presentation of miliary tuberculosis in this way is rare. Tubercular meningitis may present with seizures, but in this case meningitis could not be demonstrated.

Patient 2 was suspected of having a bleeding ulcer or aortoenteric fistula after he presented with hematochezia and hematemesis. He received a blood transfusion. Endoscopy did not demonstrate the fistula. Diagnosis in such cases is difficult.^{5,6} The patient had undergone aortofemoral bypass surgery 7 years previously.

Patient 3 presented with malaise, fatigue and weight loss. Extensive investigations were done for suspected malignant disease, vasculitis or collagen vascular disease. Necrotizing lymphadenitis was diagnosed on the basis of findings from a cervical lymph node biopsy. Autopsy disclosed a malignant lymphoma involving the sternum and liver. In retrospect the diagnosis of necrotizing lymphadenitis was changed to lymph node infarction.⁷ Iliac crest bone marrow aspiration and biopsy performed before the patient died had given negative results.

In patient 4 subdural hematoma was missed despite two CT scans and detailed neurologic examination.

In patient 5 endoscopy had demonstrated an ulcer, and a liver scan had shown a large mass in the liver. The patient died of a perforated duodenal ulcer.

Patient 6 died of massive intra-abdominal hemorrhage. Laparotomy performed a week earlier had disclosed carcinoma of the pancreas.

A class II error was found in 10 cases (22%) (Table II). A number of class III and IV errors were also found; these are not shown.

Discussion

A number of recent studies from teaching centres in the United States, Australia and Canada have shown that a substantial number of clinically important diagnoses are brought to light by autopsy.^{1-4,8} Surprisingly the number of major discrepancies between clinical and autopsy diagnoses reported in published series did not change significantly between 1919 and 1980.⁴ Nevertheless, the antemortem diagnosis of certain diseases improved considerably in the same period.

The findings in this study of 6 class I errors (13%) and 10 class II errors (22%) are comparable to those in other series. However, the mean age of the patients was considerably higher than that in other series. As older patients are more likely to have more than one disease, a greater discrepancy between clinical and autopsy diagnoses in such patients can be expected. This finding is supported in other series.^{3,9}

It has been suggested that studies of this kind be used as an audit procedure.^{8,10} The statistics gathered could be used to monitor interhospital

differences and to set standards. Such studies would also, of course, serve the traditional role of the autopsy as an educational exercise within a hospital.

To facilitate the use of autopsy data in an audit exercise, I offer the following suggestions:

- An autopsy form should be completed by the clinician before he or she has access to the autopsy findings. The form should indicate major and minor diagnoses.

- Following completion of the autopsy report, the clinician and the pathologist should reach agreement as to the type of discrepancy, if any, between clinical and autopsy findings. The discrepancies could be classified in the manner suggested by Goldman and colleagues.¹

- All class I errors should be reviewed by the department involved or an audit committee, or both.

- A report such as this one should be presented annually to the hospital audit committee. If such reports are presented in a standardized manner, interhospital comparative studies could determine an acceptable range of class I errors.

The autopsy service generates a large amount of "orphan" data, most of which remain the property of the pathologist and the clinician directly involved in the case. If the suggestions offered here were implemented, renewed interest in the important role of the autopsy might be developed.

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