

And what impact did all this have on Ward himself? Very little, it seems. Certainly he gained not at all financially—even supposing he had wanted to. Totally devoid of vanity, he was content to have made a notable invention and, philanthropist as he preferred to see himself first and foremost, to advocate its utility in the sphere of his own profession: in the wards of hospitals, for example, to raise the spirits of the patients and convey an appearance of freshness.

The original bottle, with its plants still unwatered, made an honoured appearance at the Great Exhibition in 1851. In the following year Ward was elected a Fellow of the Royal Society and two years after that Master of the Society of Apothecaries.

By then he had moved to the more salubrious environment of Clapham Rise, on the south-west side of London, out of the path of most of the capital's smoke. Here the gardening proved less arduous and he lived on happily among his cases till his death in 1868.

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## Medical Education

### Necropsy Rates in the United Birmingham Hospitals

H. A. WALDRON, LORNA VICKERSTAFF

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#### Summary

**The necropsy rate in the United Birmingham Hospitals has fallen from 74.4% in 1958 to 46.0% in 1972. In the Birmingham region as a whole the rate is 27.3%, approximately equal to the national rate.**

**Most clinicians in the group who replied to a standard questionnaire considered that the necropsy still has an important part to play in their own practice and in undergraduate training, and they viewed the declining rate as a matter for concern.**

**Some measure of disagreement was found between the ante-mortem and post-mortem diagnoses of patients in the two largest hospitals in the group. This suggests that the necropsy has a role to play in medical audit and that attempts to reverse the declining trend should be encouraged.**

#### Introduction

Until comparatively recently medical practice closely followed the model of the first Parisian school, in which the necropsy had a key role in confirming and interpreting clinical observations. As medical technology has become more sophisticated, interest has become focused more on the microscopic, submicroscopic, and biochemical concomitants of disease and less on gross morbid anatomy. A consequence of this has been a reduction in the number of necropsies performed in hospitals. This has occasioned a considerable debate, particularly among pathologists, many of whom view the trend with alarm.<sup>1-5</sup> It is frequently stated that the necropsy is an integral part of the medical audit, since it provides the final check on medical

diagnosis and treatment. Proponents of this view point to studies from a number of countries which have shown errors between ante- and post-mortem diagnoses,<sup>6-9</sup> and it has been suggested that the necropsy provides more accurate data on which to base epidemiological studies.<sup>10</sup> The discovery of many conditions, including some iatrogenic diseases, has also been credited to the necropsy.<sup>11</sup>

Against this background we have conducted a study in the United Birmingham Hospitals\* which falls into three parts. In the first the necropsy rate was studied and the trend established; in the second the attitude of the clinicians was canvassed by means of a questionnaire; and finally a retrospective study was made of ante- and post-mortem diagnoses in the two largest hospitals of the group.

#### New Rates

There has been a noticeable decline in the necropsy rate in the group over the period 1958-72 (fig. 1). In 1958 the overall rate was 74.4% whereas by 1972 it had fallen to 46.0%. In the Birmingham region as a whole computer data are available only back to 1968. Nevertheless over the four years 1968-72 the figures show a downward trend from 34.5% in 1968 to 27.3% in 1972. Necropsy rates in the region (excluding the United Birmingham Hospitals) are now almost identical with the national rates given by the Registrar General. It is interesting that the national rates have actually increased slightly since 1958, and though they include data for deaths both in and out of hospital there must be considerable regional variations hidden within the national statistics. Even within the United Birmingham group of hospitals there is a considerable difference in the rates, though all show the same downward trend. The decline in the rate is most marked for patients in the older age groups and is slightly lower in females than in males. In figs. 2 and 3 the rates are shown by sex and age group for the Queen

Department of Social Medicine, Medical School, Birmingham  
H. A. WALDRON, B.Sc., M.B., Lecturer in Social Medicine  
LORNA VICKERSTAFF, B.A., Research Associate

\* The hospitals in the group are the Queen Elizabeth Hospital, the General Hospital, the Birmingham Children's Hospital, the Birmingham Maternity Hospital, the Birmingham and Midland Women's Hospital, and the Midland Nerve Hospital. The numbers of deaths in the last three hospitals are very small and data from them are not discussed here.

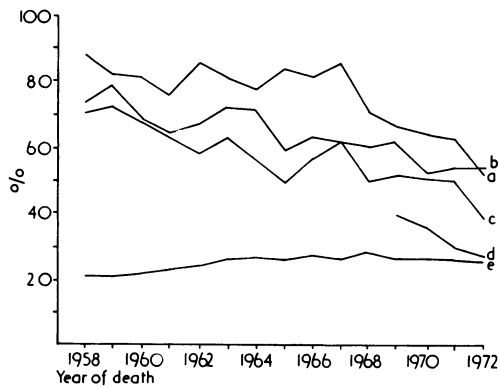


FIG. 1—Percentage of necropsies performed in the United Birmingham Hospitals: (a) Birmingham Children's Hospital, (b) General Hospital, (c) Queen Elizabeth Hospital, (d) Birmingham region apart from U.B.H., (e) national rate.

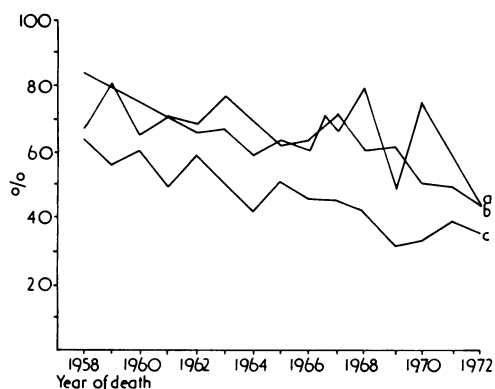


FIG. 2—Percentage of necropsies performed in the Queen Elizabeth Hospital by age group in females: (a) under 39, (b) 40-64, (c) over 65.

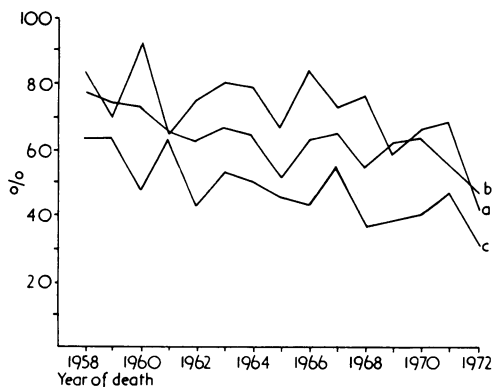


FIG. 3—Percentage of necropsies performed in the Queen Elizabeth Hospital by age group in males: (a) under 39, (b) 40-64, (c) over 65.

Elizabeth Hospital. The data from the General Hospital show similar trends.

The decline in the necropsy rate has also been studied by disease by classifying each cause of death according to the 8th revision of the International Classification of Diseases (I.C.D.). The great majority of deaths fell into one of the three following categories: neoplasms (I.C.D. 140-199), diseases of the circulatory system (I.C.D. 390-458), and diseases of the respiratory system (I.C.D. 460-519). In each of these three categories there was a fall in the rate over the years studied, though individual rates showed considerable fluctuations. The steepest decline was shown for the patients dying from neoplastic

disease and probably reflects the confidence which the clinician is now able to place in his diagnosis. In the Queen Elizabeth Hospital, which has the largest inpatient oncology unit in the group, the necropsy rate was 61.7% in 1958 but only 27.1% in 1972. In the General Hospital the corresponding figures were 62.9% and 48.2%.

### Clinical Attitudes

A questionnaire was circulated to all the clinical consultants in the United Birmingham Hospitals to find the reasons to which they attributed the decline in the necropsy rate and whether they thought the necropsy had an important part to play in their own practice and in undergraduate training. A total of 70 questionnaires was sent out; 55 were completed and returned.

The reasons given for the decline in the necropsy rate are complex, but over half those replying thought that it was due to increasing resistance on the part of the relatives and some felt that it should not be necessary to ask for permission to conduct a necropsy. A substantial number of consultants also considered that there had been a change in the attitude of the profession towards the necropsy, a fifth being of the opinion that there was a general feeling among doctors that it was outdated, and considerably more thought that the junior hospital staff were now more reluctant to ask for permission to conduct a post-mortem examination.

A major contributory factor to emerge was that fewer clinicians rely on the necropsy to give them the cause of death, either because they are more certain of their ante-mortem diagnosis or because they feel that the necropsy does not provide them with the information which they require to decide what the *immediate* cause of death was. Most clinicians, however, still believed that the necropsy has an important role in the context of general medical care and in undergraduate training and would like to see it carried out in every case. Almost all the consultants reported that it brought to light conditions not previously suspected or caused them to modify their ante-mortem diagnosis in a substantial number of cases. In addition, three-quarters stated that post-mortem findings resulted in the modification of treatment for subsequent patients.

### A Comparison

By comparing the clinical diagnosis obtained from the clinical notes with the post-mortem diagnosis obtained from the necropsy records we were able to discover some measure of disagreement between the two. The study was confined to the Queen Elizabeth Hospital and the General Hospital since the number of deaths in the other hospitals is so small. For four separate years the principal diagnosis given in the patient's clinical notes was compared with the principal diagnosis in the necropsy records. The results are shown in the table.

Percentage Disagreement between Ante-mortem and Post-mortem Diagnoses in Two Hospitals in the United Birmingham Group

Year	Percentage Disagreement		
	Males	Females	Total
1959	18	21	20
1964	19	29	23
1968	19	28	22
1972	20	25	22

The measure of disagreement was less than that reported by Heasman and Lipworth<sup>12</sup> in their much more extensive study, and the results given here must obviously be interpreted with some caution, since we were relying on second-hand information to provide our diagnosis. For example, we could not be sure

that the diagnosis had not been changed in the clinician's mind but not the notes. Also in a substantial number of cases (about 20%) it was not possible to extract a principal diagnosis from the clinical notes. Nevertheless, it seems reasonable to conclude that diagnosis is still an imperfect art which can benefit from some sort of audit such as can be provided by the necropsy.

#### Further Study

We are now planning a prospective study involving two regions of the country which we hope will give more information of the degree of concordance between ante-mortem and post-mortem diagnosis. If this confirms our retrospective study, there will be a strong case for attempting to reverse the downward trend in necropsy rates.

We would like to thank Miss Mary Wall and Mr. L. Dallow for their help in obtaining the data from which the necropsy rates were derived, Dr. Christine Hassall for help in constructing the ques-

tionary, and the clinicians who so kindly completed them for us. We would also like to acknowledge our indebtedness to the Nuffield Provincial Hospitals Trust for their grant in support of this study.

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## Hospital Topics

### Fibrillation of Head of Radius as One Cause of Tennis Elbow

J. H. NEWMAN, J. W. GOODFELLOW

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#### Summary

**Twenty-five patients with resistant tennis elbow were treated by exploration of the radio-humeral joint. Twenty cases showed abnormalities of the cartilage of the head of the radius. Division of the orbicular ligament and excision of the abnormal cartilage gave good results in 19 of the 20 cases seen recently. We believe fibrillation of the head of the radius is an important cause of tennis elbow, and the arguments to support this theory are enumerated.**

#### Introduction

Many theories exist of the cause of tennis elbow, but few of the suggested pathological changes have subsequently been convincingly demonstrated. Osgood<sup>1</sup> considered it to be a bursitis and cured three patients by excising a radio-humeral bursa. Neither Hughes<sup>2</sup> nor Goldie<sup>3</sup> could detect a bursa but both found abnormal granulation tissue beneath the extensor origin, and that its removal cured the patient. Many believe that pain arises from minute tears in the region of the extensor origin, but such lesions have rarely been demonstrated until recently.<sup>4</sup>

Hughes<sup>2</sup> was unable to find any abnormality of the extensor origin in 16 explorations, while Spencer and Hernod<sup>5</sup> found specks of calcium in only two out of 49 cases, and no abnormality in the others. Moore<sup>6</sup> believed that trapped synovial fringes were causative and found such a fringe in all 10 cases reported. Recently cases of tennis elbow have been attributed to a radial tunnel syndrome,<sup>7</sup> and nerve decompression has resulted in symptomatic improvement.

Bosworth<sup>8</sup> explored the lateral aspect of the elbow in 62 patients suffering from tennis elbow. In 25 cases thickening was noted in the extensor origin, in 32 cases degenerative changes were found in the orbicular ligament, and in 4 chondromalacia of the head of the radius was noted. However, this last pathological feature was not looked for as a routine. He concludes that symptoms arise from the degenerative changes in the orbicular ligament and believes that the "eccentric" nature of the head of the radius is responsible. We also believe that pain arises from the region of the orbicular ligament but that the most important initiating factor is the underlying fibrillation of the head of the radius.

#### Clinical Features

Fibrillation of the head of the radius presents in middle age as pain on the lateral aspect of the elbow, which is often precipitated by repetitive pronation and supination movements. The pain is worsened by active dorsiflexion of the wrist. This can result in apparent weakness of grip and thus inability to carry. We believe a characteristic of this condition to be that the tenderness is over the head of the radius and not over the lateral epicondyle. The head of the radius can be readily palpated, and the site of maximal tenderness is elicited by full pronation of

#### General Hospital, Nottingham

J. H. NEWMAN, M.B., F.R.C.S., Senior Orthopaedic Registrar

#### Nuffield Orthopaedic Centre, Oxford

J. W. GOODFELLOW, M.B., F.R.C.S., Consultant Orthopaedic Surgeon