Immunohistochemical panel and results

<i>Antibody</i>	<i>Source</i>	<i>Case 1</i>	<i>Case 2</i>
AE1	Hybritech	+	+++
CAM 5:2	Becton Dickinson	+	+++
Keratin 13	Progen	—	+ (focal)
Keratin 903	Enzo	—	+++
Keratin 904	Enzo	—	—
EMA (E29)	Dakopatts	+ (focal)	+ (focal)
CEA (PARLAM 4)	Eurodiagnostics	+ (focal)	+ (focal)
Gamma-enolase (MIG-N3)	Monosan	+ (focal)	—
Chromogranin	Hybritech	—	—
Vimentin (V9)	Dakopatts	—	—
Actin (HHF-35)	Enzo	—	—
S-100 (polyclonal)	Dakopatts	—	—

AE1 (acidic keratins), CAM 5.2 (keratins 8, 18, 19), keratin 903 (keratins 1, 5, 10, 11), keratin 904 (keratin 1), EMA (epithelial membrane antigen), CEA (carcinoembryonic antigen), enolase (neurone specific gamma-enolase), actin (muscle specific actin).

mediate hyperchromatic cells with a high nuclear:cytoplasmic ratio and frequent mitoses were arranged in large lobes and strands. No evidence of differentiation was observed. Necrosis and bleeding were prominent features. An immunohistochemical study using several epithelial, mesenchymal, and neuroendocrine markers was performed (table).

Discussion

The immunohistochemical results expressed in the table basically agree with those of Hui *et al.*² Because of negative actin and S-100 protein immunostaining, an absence of myoepithelial cells could be assumed in our cases. Differentiation towards both glandular and neuroendocrine features occurred in case 1, as was shown by positivity for AE1, CAM 5.2, CEA, and gamma-enolase. A complex expression of cytokeratins was evident in case 2; both glandular and non-keratinising

squamous differentiation were seen.

The absence of a myoepithelial component in these cases has not been reported previously. According to Batsakis *et al.*,³ this suggests a presumptive histogenetic origin from the excretory duct. On the other hand, multidirectional differentiation pathways occurring during oncogenesis may permit the simultaneous development of neuroendocrine and exocrine components. This fact, observed in case 1, has also been recently reported in undifferentiated carcinoma of parotid gland⁴ as well as in other salivary gland neoplasms.⁵⁻⁷ Finally, expression of keratin 903 (cytokeratins 1, 5, 10, and 11, expressed by basal cells), as well as CAM 5.2 keratin (cytokeratins 8, 18, and 19) reflects the fact that multiple immunophenotypes occur in these carcinomas and adds further support to the notion of occult differentiating pathways.

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Morbidity survey of post mortem room staff

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Abstract

A retrospective study of post mortem staff who had taken leave due to sickness was carried out over a 12 month period throughout England and Wales. Eight hundred and nineteen post mortem room personnel (representing a 57% response) replied to individual postal questionnaires regarding their sick leave of two days or more, for the period June 1985 to June 1986. Complete responses were available for 751. Post mortem room technical staff reported more mean days sickness per person (7.8) than either pathologists (1.6) or a control group of coroners' officers (3.9). The annual inception rate (frequency by spells) was also higher among technicians than the other two groups. Technical staff had more infectious disease (0.73 mean days of

absence compared with pathologists (0.10) or coroners' officers (0.12)) and more frequent absences due to cuts and lacerations.

Infection risks associated with health care work were at one time considered unavoidable. Despite epidemiological evidence that a demonstrable risk to health exists¹⁻³ and the introduction of corresponding health and safety legislation, occupational morbidity in particular subgroups of health care workers is still evident.^{4,5} Certain categories of health care work are perceived to carry a greater inherent health risk, not only from contact with diseased subjects and blood and body fluids, but also from injury through the use of potentially dangerous equipment. One such occupation is post mortem work where both technical and medical staff are at risk.

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Table 1 Sickness absence among study and control groups between 1985 and 1986

	Post mortem workers	Pathologists	Technicians	Coroners' officers
Number of participants*	751	383	351	182
Number of days sickness absence	3380	612	2749	719
Mean number of days per person	4.5	1.6	7.83	3.9
Total number of spells a year	289	62	223	52
Annual inception rate (spells)†	0.38	0.16	0.64	0.29
Average length of spell (days)	11.7	9.87	12.33	13.83

*17 post mortem workers did not indicate "pathologist" or "technician".

†Number of spells of sickness

Number of individuals in study group

Methods

The study population comprised 774 consultant pathologists, 588 anatomical pathology technicians, and 76 public mortuary technicians working in England and Wales. Each was asked to complete a self-administered health questionnaire describing their sickness absence record (days and spells) for the period June 1985 to June 1986. Three hundred and forty three police and coroners' officers were chosen as a comparison group.

Results

The overall response rates were less than was hoped, but comparable with many such questionnaire surveys, ranging from 52% for pathologists to 61% for coroners' officers. The mean (SD) ages of the pathologists, technicians, and coroners' officers were 46 (10.8), 42 (12.4), and 46 (5.3) years, respectively. Men greatly outnumbered women in all groups.

Table 1 summarises the sickness absence data for spells of two days or more. Technicians reported a significantly higher number of days of absence ($p = 0.0024$) and pathologists a significantly lower number ($p = 0.019$) than the control population. Annual inception rates showed the same pattern.

The causes of sickness absence were grouped according to the International Classification of Diseases, ninth review, WHO, 1977, and are shown for the three groups in table 2.

Respiratory disease, as might be expected, ranks highly, but a notable finding is the fact that technicians had more "infectious and parasitic diseases" and "digestive" diseases than the other two groups. Absence for cuts

and lacerations was restricted to the technicians. One case of tuberculosis (in an anatomical pathology technician) and two cases of hepatitis B (one technician and one coroners' officer) were reported in the 12 month period. The rate for post mortem room technicians for these diseases (285/100 000 person years) is comparable with the findings of previously published studies.⁴

Younger workers with shorter length of service reported more illness than others and the same age preference applied to cuts and lacerations. Indeed, accidents resulting in cuts and lacerations whether or not they caused absence from work affected 21 post mortem room staff (four pathologists and 17 technicians). The proportion of gloves punctured during post mortem examinations⁶ indicated a similar preponderance of technicians affected compared with pathologists.

Discussion

Postal questionnaires are prone to low response rates but are a useful way of canvassing information from large scattered populations. Some persons did not respond because they were regular participants in Grist's biennial surveys. Nevertheless, a response rate of 60% implies that the results should be interpreted with caution.

The results showed higher rates of sickness absence for technicians than their consultant counterparts or the coroners' officers. Difference in socioeconomic group might account for some of this variation but national rates⁷ suggest that such a factor could cause a 1.7 fold difference, not the 4–5 fold difference noted here. Apart from the expected high rates for respiratory disorders, the digestive

Table 2 Comparison of causes of sickness absence among pathologists, technicians and coroners' officers

Cause	Mean number of days per person			Annual inception rate (spells)			Average length of spell (days)		
	Pathologists	Technicians	Coroners' officers	Pathologists	Technicians	Coroners' officers	Pathologists	Technicians	Coroners' officers
Infectious	0.10	0.73	0.12	0.016	0.085	0.016	6.67	8.50	7.33
Respiratory	0.50*	2.35*	0.64	0.099*	0.288*	0.099*	5.03	8.27	6.44
Digestive	0.01	1.49	0.95*	0.003	0.048	0.038	3.00	30.70	24.71
Skin	0	0.03	0	0	0.009	0	0	3.00	0
Musculo-skeletal	0.04	0.59	0.31	0.005	0.004	0.033	8.50	13.73	9.50
Genitourinary	0.01	0.07	0.04	0.003	0.003	0.005	5.00	25.00	7.00
Nervous	0.21	0.38	0.45	0.016	0.014	0.027	13.17	26.40	16.20
Ill defined symptoms	0.04	0.23	0.21	0.003	0.031	0.011	14.00	7.27	18.50
Fractures	0.15	0.34	0.50	0.003	0.009	0.011	14.00	39.67*	46.00*
Sprains	0.06	0.15	0.03	0.003	0.017	0.011	21.00*	8.83	3.00
Cuts/lacerations	0	0.08	0	0	0.009	0	0	9.67	0
External injuries	0	0.11	0	0	0	0	0	8.00	0
Other injuries	0	0.31	0.62	0	0.026	0.027	0	12.22	22.60
Neoplasms	0	0.06	0	0	0.003	0	0	20.00	0
Other causes	0.28	0.90	0.08	0.010	0.037	0.005	26.75	24.15	15.00

Note: the highest value in each column is asterisked.

and infectious disease excesses noted in the technicians was similar to the findings of a large scale survey of medical laboratory workers.³

The distinction between hazard and risk from occupational ill health is now the basis of the recently introduced Control of Substances Hazardous to Health Regulations (1988),⁸ which includes a requirement to assess the risks associated with exposure to microbiological as well as chemical agents in the workplace. Epidemiological investigations based on occupational sickness absence records such as this may assist occupational health staff in making such assessments.

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Multipoint microbiological assay for detecting β -lactamase

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Abstract

A multipoint microbiological assay for determining β -lactamase production by clinical isolates of bacteria was evaluated. With strains of *Haemophilus influenzae*, *Neisseria gonorrhoeae*, and *Branhamella catarrhalis* there was excellent correlation between results obtained using this method and those obtained using the chromogenic cephalosporin reference method. The multipoint method is an inexpensive yet reliable adjunct to conventional susceptibility testing methods.

The susceptibility testing of micro-organisms such as *Branhamella catarrhalis*, *Haemophilus influenzae*, and *Neisseria gonorrhoeae* using the agar-dilution method has been described.¹ One drawback of this method is that traditional indicators of β -lactamase activity—reduced zone size and increased colony size at zone edges around antibiotic discs—are absent. We believe *B. catarrhalis* poses a particular problem (unpublished observations). Although around 50% of strains are resistant to ampicillin as indicated by β -lactamase production,² many appear susceptible using the accepted ampicillin "break-point" of 1 mg/l.³ With *B. catarrhalis*, therefore, it is imperative to determine whether β -lactamase is produced if an agar dilution susceptibility testing method is to be used. Detection of β -lactamase production in *H. influenzae* and *N. gonorrhoeae* also has important clinical implications.

Diagnostic laboratories use four methods

for β -lactamase detection. Hydrolysis of the β -lactam bond yields a dibasic acid which can be detected by a change in pH—the acidometric method⁴ or by the ability to reduce iodine—the iodometric method.⁵ With the chromogenic cephalosporin,⁶ an electron shift in the cephalosporin molecule yields a coloured product. Loss of antibacterial activity may also be detected by microbiological assays which use susceptible bacteria to detect breakdown of β -lactam antibiotics by organisms which are applied by streaking, or on membranes or filter paper discs.⁷ The origins of such assays lie in clinical observations of "indirect pathogenicity".⁸ Of these methods, the microbiological assay has proved the easiest to adapt to multipoint methodology.

Methods

Diagnostic Sensitivity Test agar (DST:Oxoid) was supplemented with lysed horse blood (7%) and nicotinamide adenine dinucleotide (Boehringer Mannheim; 20 mg/l) to facilitate growth of fastidious organisms. An anti-swarming agent (1-4-Nitrophenyl-glycerol: 55 mg/l) and penicillin (0.02 mg/l) were added and the plate was surface seeded with *Staphylococcus aureus* (NCTC 6571: 10^5 cfu/ml). This plate was inoculated with the bacteria under test after the conventional antibiotic "break-point" set had been inoculated. Overnight incubation in 7% carbon dioxide showed a "satellite" of growth around organisms producing β -lactamase (figure).

To assess the reliability of the multipoint method we compared it with the chromogenic

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