LUNG CANCER PROGNOSIS AND ROUTINE RADIOGRAPHY

BY

K. P. DUNCAN, B.Sc., M.B., CH.B., D.I.H., CHIEF MEDICAL OFFICER, U.K.A.E.A.

AND

R. W. HOWELL, A.M.R., RADIOLOGICAL PROTECTION DIVISION, U.K.A.E.A.

*United Kingdom Atomic Energy Authority,
Authority Health and Safety Branch, Harwell, Berkshire*

Duncan and Howell (1967) reported a series of 141 cases of primary lung cancer arising in male employees of the U.K. Atomic Energy Authority. 5-year survival rates were 18 per cent. in Authority-diagnosed patients and 2 per cent. in those diagnosed externally. In the Authority-diagnosed patients, 5-year survival rates were 26 per cent. in those judged free of symptoms at the time the patient was x-rayed, and 9 per cent. for those with symptoms. Where staff are undergoing routine x-ray examination, more frequent x-ray examination for those over the age of 40 can be satisfactorily achieved without extra work or cost by increasing the examination interval for those aged 40 or under. This will also limit the radiation exposure of the younger age groups to the lowest possible level. Such a procedure may be diagnostically beneficial.

The series has now been extended to include 181 patients and to cover a further 2 years of follow-up; a review has therefore been undertaken to ascertain whether the original differences in survival rates persist.

This note does not attempt to expand or repeat the comment or discussion of the original paper, but sets out to show the original four tables modified to include the larger number of patients and the longer follow-up period.

INCIDENCE

Table I shows that there has been no great variation in age-specific incidence rates within the Authority, other than in the 65 to 69-year age group, where the number of cases is small (12) and the population limited (3,500 man-years of exposure).

TABLE I
AGE-SPECIFIC INCIDENCE OF LUNG CANCER
IN AUTHORITY MALE STAFF

Age Group (yrs)	Incidence per 1,000 Staff per annum (UKAEA, 1960-67)	Incidence per 1,000 Males (SMCR*, 1960)	Death Rate per 1,000 Male Population (England and Wales, 1964)
35-44	0.1	0.2	0.1
45-54	0.6	1.0	0.8
55-64	2.3	3.2	2.1
65-69	3.5	4.1	3.5

* South Metropolitan Cancer Registry.

5-YEAR SURVIVAL RATES

Table II confirms the difference in survival rates demonstrated in the original report, between those patients diagnosed by the Authority and those found externally. The effect of the longer follow-up and larger series has been to bring the external 5-year

TABLE II
UKAEA OBSERVED SURVIVAL RATES—1967 FOLLOW-UP

Diagnosis	Follow-up Year	Patients Alive at Start of Year	No. dying in Year	Too Recent for Further Follow-up	Effective No. Exposed to Risk	Annual Death Rate	Annual Survival Rate	5-year Survival (per cent.)
External	1st	91	75	0	91	.824	.176	4.4
	2nd	16	9	3	14.5	.621	.379	
	3rd	4	1	2	3	.333	.667	
	4th	1	0	0				
	5th	1	0	0				
Authority	1st	90	34	0	90	.378	.622	17.1
	2nd	56	27	2	55	.491	.509	
	3rd	27	5	1	26.5	.189	.811	
	4th	21	3	3	19.5	.154	.846	
	5th	15	3	2	14	.214	.786	

rate nearer to the 4 per cent. reported by the Ministry of Health (1960). There has been a slight reduction in the rate for internally diagnosed patients, from 18 to 17·1 per cent., but the variation between prognosis for internal and external cases remains very real.

There are 22 new externally diagnosed cases and eighteen new Authority cases. There are no new 5-year survivors among the external cases but there are three more among those discovered by occupational routine radiography. It is an interesting, but so far unexplained point, that the ratio of cases diagnosed by the occupational health service to those diagnosed by the National Health Service remains almost constant at 1:1.

Table III shows that the reduction in survival in the Authority-diagnosed cases stems from both those patients without symptoms at the time of diagnosis and those for whom symptoms were noted. Nevertheless the findings of the original report are well maintained, with the only real chance of survival occurring in those diagnosed and selected for surgery while still free of symptoms.

Two outside cases in the enlarged series were picked up by routine *x* ray by mass miniature radiography. In those who died, survival was longest in those free of symptoms at diagnosis, regardless of the method of discovery. Authority-discovered

patients had better survival times in all categories (Table IV).

DISCUSSION

The original paper discussed the pros and cons of routine radiography at some length and no subsequent relevant publication has been noted. In general, the prognostic improvement attributed in the literature to early diagnosis by radiography has been disappointing, but our experience, though the outlook is still poor, is more encouraging.

While the numbers involved are still not large and it has proved impossible to combine satisfactorily with other organizations to increase the total, it is felt that the continuation of this quite definite trend justifies underlining the original findings. As a consequence of this increasing conviction, the need to replan routine chest radiography periodicity requires emphasis. The importance of the very high acceptance rate is also underlined.

The data will be up-dated and reviewed again in 5 years' time.

SUMMARY

Data previously presented on the results of a routine radiography programme have been augmented

TABLE III
UKAEA OBSERVED SURVIVAL RATES IN AUTHORITY-DIAGNOSED PATIENTS—1967 FOLLOW-UP

Symptoms	Follow-up Year	Patients Alive at Start of Year	No. dying in Year	Too Recent for Further Follow-up	Effective No. Exposed to Risk	Annual Death Rate	Annual Survival Rate	5-year Survival (per cent.)
Absent	1st	41	9	0	41	·220	·780	23·8
	2nd	32	16	1	31·5	·508	·492	
	3rd	15	3	0	15	·200	·800	
	4th	12	1	3	10·5	·095	·905	
	5th	8	1	2	7	·143	·857	
Present	1st	36	20	0	36	·556	·444	6·1
	2nd	16	8	1	15·5	·516	·484	
	3rd	7	1	0	7	·143	·857	
	4th	6	2	0	6	·333	·667	
	5th	4	2	0	4	·500	·500	

TABLE IV
AVERAGE SURVIVAL TIME IN ALL FATAL UKAEA CASES

Diagnostic Source	Symptom-Free at Diagnosis			With Symptoms at Diagnosis			Symptomatology not Recorded		
	No. of Cases	Survival		No. of Cases	Survival		No. of Cases	Survival	
		Average (mths)	Range (mths)		Average (mths)	Range (mths)		Average (mths)	Range (mths)
Authority	31	20	3-72	34	16	1-88	10	18	3-70
G.P. and other ..	5	11	1-34	76	6	0-87	3	9	3-15
External MMR ..							1	9	

and up-dated. Male employees of the U.K. Atomic Energy Authority showed a 5-year survival rate of 17·1 per cent. in Authority-diagnosed patients compared with 4·4 per cent. for those diagnosed externally. Freedom from symptoms at diagnosis and early surgery were the only hopeful prognostic indications. The value of more frequent chest x ray after the age of 40 compared with examination at younger ages is emphasized.

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