

# The prevalence and age distribution of peripheral pulmonary hamartomas in adult males

## An autopsy-based study

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### Summary

This autopsy-based study defined the prevalence and age distribution of peripheral pulmonary hamartomas in 47 635 southern African miners examined between 1975 and 1988. The prevalence rate for white miners was 7,5/1 000 and for black miners 1,1/1 000. When directly standardised to the white men in the general population, the rates for white and black miners were 7,2 and 5,5/1 000, respectively. The prevalence of peripheral pulmonary hamartomas in both groups increased with age, from 0,8/1 000 in the third decade to 12,0/1 000 in the eighth decade. The study showed a much higher prevalence of peripheral pulmonary hamartomas for whites than previously reported. Furthermore, it documented the occurrence of these benign lung tumours in blacks, a fact that has previously been questioned. There appeared to be no significant difference in prevalence and age distribution between white and black miners, although the database for the black group was deficient for the later decades of life.

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Peripheral pulmonary hamartomas are benign lesions, usually detected radiologically as incidental findings in asymptomatic individuals. They enter into the differential diagnosis of coin lesions in the lung; most reports concerning the prevalence

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and age distribution of peripheral pulmonary hamartomas are based on cases referred for investigation of solitary pulmonary nodules.

In a recent South African series,<sup>1</sup> 14 of 530 patients (2,6%) with coin lesions undergoing fine-needle aspiration cytology were found to have peripheral pulmonary hamartomas. No cases occurred in blacks, raising the question whether this is a true reflection of disease prevalence. As far as we are aware, the racial distribution of these lesions has not previously been addressed.

The prevalence and age distribution of peripheral pulmonary hamartomas in an autopsy-based series of black and white southern African miners is described.

### Subjects and methods

Autopsy examination of the cardiorespiratory organs for compensation purposes is required by law for all miners and ex-miners who die in South Africa, provided the next of kin agree.<sup>2</sup> The goldmining industry, which has the largest workforce in South Africa, accounts for approximately 80% of these autopsies. Other types of mining, including platinum, asbestos and coal, as well as industries involved in primary ore processing, are covered by this legislation.

Comprehensive macroscopic and microscopic examination of the heart and lungs is undertaken by the pathology service of the National Centre for Occupational Health. Results of the autopsies are recorded on structured, numerically coded reports and entered in a computerised system, the PATHAUT database.<sup>3</sup>

The autopsy records from 1975 to 1988 were reviewed for all cases of peripheral pulmonary hamartomas. The age and race distribution of cases was compared with that of the whole autopsied population.

Mortality statistics for the total South African male population for 1986 and 1987 were obtained from Central Statistical

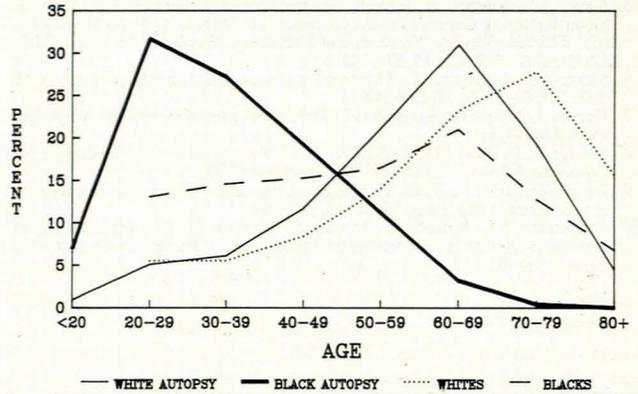
Services.<sup>4,5</sup> Prevalence rates and 95% confidence intervals (CIs) were calculated. Crude rates were standardised using the South African white male population as a standard.<sup>6</sup>

**Results**

A total of 47 635 autopsies was performed, approximately two-thirds on black men (32 002) and one-third on white men (15 633) (Table I). The age distribution of white deaths in this autopsy series was similar to that of white men in the general population. However, the majority of deaths occurred in the sixth decade in the autopsy population and in the seventh in the general population. The age distribution in black autopsy cases was, however, very different from that of blacks in the general population (Fig. 1).

The cases of peripheral pulmonary hamartomas identified numbered 152 — 118 (77,6%) in whites and 34 (22,4%) in blacks. The age distribution of autopsied men with peripheral pulmonary hamartomas is shown in Table II. In whites, the majority of deaths (81; 69,6%) occurred in the sixth and seventh decades; in blacks, the majority (23; 67,7%) occurred in the fifth and sixth decades.

Table III shows the age-specific prevalence rate of peripheral pulmonary hamartomas in the two groups. The rate increased with age in both groups. The overall prevalence rate for whites was 7,5/1 000 (CI 6,1 - 8,8) and for blacks 1,1/1 000 (CI 0,8 - 1,4). The age prevalence differed between the two groups, with a much higher rate of peripheral pulmonary hamartomas in whites. These rates, however, must be interpreted with



**Fig. 1. Age distribution of deaths in population and autopsy series.**

caution due to differences in the age distribution between white and black autopsy cases. When the rates for whites and blacks were directly standardised to white males in the general population, the peripheral pulmonary hamartoma rate decreased slightly to 7,2/1 000 (CI 6,0 - 8,3) for whites but increased to a much higher rate of 5,5/1 000 (CI 4,5 - 6,5) for blacks.

**Discussion**

Peripheral pulmonary hamartomas occur as asymptomatic, well-circumscribed, intrapulmonary lesions composed of carti-

**TABLE I. AGE DISTRIBUTION OF WHITE AND BLACK MALE DEATHS IN THE AUTOPSY SERIES AND IN THE GENERAL POPULATION**

Age (yrs)	Autopsy series				General population			
	White		Black		White*		Black*	
	No.	%	No.	%	No.	%	No.	%
< 20	149	0,9	2 241	7,0		N/A		N/A
20-29	808	5,1	10 146	31,7	1 131	5,5	5 390	13,1
30-39	954	6,1	8 704	27,2	1 131	5,5	6 016	14,1
40-49	1 837	11,7	6 165	19,2	1 729	8,4	6 299	15,3
50-59	3 305	21,1	3 575	11,2	2 887	14,0	6 799	16,5
60-69	4 855	31,0	1 026	3,2	4 780	23,2	8 640	21,0
70-79	3 019	19,3	132	0,4	5 730	28,8	5 273	12,8
> 80	709	4,5	13	0,1	3 242	15,7	2 800	6,8
<b>Total</b>	<b>15 633</b>	<b>100</b>	<b>32 002</b>	<b>100</b>	<b>20 630</b>	<b>100</b>	<b>41 217</b>	<b>100</b>

\* Central Statistical Services Reports.<sup>4,5</sup>  
N/A = not available.

**TABLE II. AGE DISTRIBUTION OF AUTOPSIED MEN WITH PERIPHERAL PULMONARY HAMARTOMAS**

Age (yrs)	White		Black		Total	
	No.	%	No.	%	No.	%
< 20	0	0	0	0	0	0
20-29	1	0,8	1	2,9	2	1,3
30-39	1	0,8	5	14,7	6	3,9
40-49	11	9,3	11	32,4	22	14,5
50-59	12	10,2	12	35,3	24	15,8
60-69	45	38,1	3	8,8	48	31,6
70-79	36	30,5	2	5,9	38	25,0
> 80	12	10,2	0	0	12	7,9
<b>Total</b>	<b>118</b>	<b>100</b>	<b>34</b>	<b>100</b>	<b>152</b>	<b>100</b>

TABLE III. AGE-SPECIFIC PERIPHERAL PULMONARY HAMARTOMA PREVALENCE RATE PER 1 000 IN THE AUTOPSY SERIES

Age (yrs)	White		Black		Total	
	Rate	95% CI	Rate	95% CI	Rate	95% CI
20-29	1,2	0,03 - 2,37	0,1	0,00 - 0,20	0,8	0,37 - 1,23
30-39	1,0	0,02 - 1,98	0,6	0,20 - 1,00	0,5	0,16 - 0,84
40-49	6,0	3,01 - 8,99	1,8	0,90 - 2,70	2,3	1,38 - 3,22
50-59	3,6	1,86 - 5,34	3,3	1,69 - 4,91	3,0	1,84 - 4,16
60-69	9,3	6,81 - 11,79	2,9	0,57 - 5,23	8,2	6,04 - 10,36
70-79	11,9	8,35 - 15,45	15,1	1,71 - 28,49	12,0	8,51 - 15,49
>80	16,9	8,81 - 24,99	—	—	16,7	8,66 - 24,74
Total	7,5	6,21 - 8,79	1,1	0,77 - 1,43	3,2	2,71 - 3,69

lage and adipose, fibrous or myxoid connective tissue. Frequently there are admixtures of these mesenchymal constituents.<sup>7</sup> Pathologists now agree that these are not hamartomas but are true neoplasms of primitive bronchial mesenchymal tissue that has the capacity to differentiate towards multiple mesenchymal components.<sup>7,8</sup> Since no case has been unequivocally proven to be malignant disease, these lesions are generally accepted to be benign.

Peripheral pulmonary hamartomas have become increasingly important lesions with the widespread utilisation of mass survey and general health examination chest radiographs, where they require differentiation from, *inter alia*, lung cancer and metastases. Peripheral pulmonary hamartomas are the most common benign tumours diagnosed in the investigation of solitary pulmonary nodules. In large series of radiologically detected coin lesions, the incidence of peripheral pulmonary hamartomas ranges from 2,2% to about 12%.<sup>1,7,9,10</sup>

The prevalence of peripheral pulmonary hamartomas in the general population is uncertain. In 1945 McDonald *et al.*<sup>11</sup> found a prevalence of 2,5/1000 (20 of 7972 consecutive autopsies) in a hospital-based autopsy series that included males and females of all ages. The series of adult males described in our study showed an overall prevalence rate of 3,2/1000 (7,5/1000 in white men and 1,1/1000 in black men). In most series, peripheral pulmonary hamartomas occur more frequently in male subjects.<sup>1,7,9</sup> This is probably attributable to the preferential participation of men in mass radiographic screening, the usual way in which peripheral pulmonary hamartomas are detected. Several studies, however, suggest that there is no definite difference in sexual distribution.<sup>12,13</sup>

There is strong evidence to suggest that peripheral pulmonary hamartomas are age-related lesions; they rarely occur in childhood and are never seen at birth.<sup>14</sup> The peak prevalence is reported to be in the sixth and seventh decades.<sup>7,9,12</sup> In this series, the prevalence rate of peripheral pulmonary hamartomas in both blacks and whites increased with age — from 0,8/1000 in the third decade to 12,0/1000 in the eighth decade (Table III).

The small percentage of blacks autopsied after the age of 50 years probably accounts for the much lower prevalence of peripheral pulmonary hamartomas in this racial group compared with whites. The observed differences in the age distribution of autopsies in the two racial groups are explained by different employment practices. Blacks tend to be migrants who work for a short while and then return to the tribal areas where lack of accessibility to medical services means that they are infrequently autopsied after leaving employment on the mines. Whites, on the other hand, are more likely to make a lifetime career of mining and come to autopsy after retirement. The percentage of blacks over 50 years of age who were autopsied was only 14,8% compared with 75,9% for whites (Table I).

The question whether the findings in this series are applicable to the general adult male population must be addressed. There is no published evidence to suggest that peripheral pulmonary hamartomas are environmentally related lesions. Current estimates indicate that 86% of white goldminers dying in service or in retirement undergo autopsy.<sup>3</sup> Furthermore, the age distributions of deaths in the general population and in this autopsy series are comparable for whites (Fig. 1). The autopsy rate for black workers is unknown but is probably less than that for whites; the age distribution of deaths in the autopsied black workers is very different from the general population (Table II), for reasons discussed. However, when the peripheral pulmonary hamartoma rates were directly standardised, the prevalence for white men was 7,2/1000 and for black men 5,5/1000.

In conclusion, this autopsy-based series has shown a much higher prevalence of peripheral pulmonary hamartoma than previously reported (for whites) and the authors are inclined to accept this as a valid rate for adult white males for reasons discussed. In addition, the occurrence of peripheral pulmonary hamartoma in black men has been described, although defects in the database are acknowledged.

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