

Common sense, self-evident or a
research finding?

- continued exposure of workers
with silica-associated diseases.

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**Continued exposure to silica after diagnosis of silicosis in
Brazilian gold miners. Carniero et al. Am J Ind Med 49: 811-818
(2006)**

- 83 former gold miners
- median 21 years from first diagnosis (sil)
- 44 had continued exposure
- 39 ceased exposure at diagnosis
- outcome measures: radiological severity of silicosis and complication by tuberculosis

BACKGROUND

- region: Nova Lima state: Minas Gerais
- 4,500 cases of silicosis diagnosed in past twenty years (1978-1998 approx)
- 1,500 subjects have taken legal action
- court decision – ‘expert evaluation’
- 140 (9.3%) randomly referred for evaluation between 1997 and 1999
- 83 (59%) confirmed – silicosis \geq ILO 1/0

ASSUMPTIONS

- silicosis is a dose-response gradient
- related to duration and magnitude of silica exposure (Hnizdo and Sluis-Cremer, 1993)
- predisposes to COPD (Hnizdo and Vallyathan, 2003)
- and to tuberculosis (Hnizdo and Murray, 1998)
- and is carcinogenic

GROUP DIFFERENCES

- those who continued exposure were younger at first diagnosis – 36.8 v. 42.7 years)
- had shorter exposure at first diagnosis – 9.9 v.16.2 years
- had 6.6 years exposure post-diagnosis
- were evaluated sooner after cessation – 14.8 v. 17.9 years ‘n/s’

OUTCOMES

TUBERCULOSIS (20/83) YES 14 NO 6
(70% v 30%)

SEVERE SILICOSIS

CATEGORY 3 (19/83) YES 14 NO 5
(74% v 26%)

COALESCENCE AND/OR L/OPACITIES
(22/83) YES 16 NO 6
(73% v 27%)

CONCLUSIONS AND RECOMMENDATION

- Continued exposure was associated with greater radiological and functional severity of silicosis
- and with greater clinical severity due to the associated tuberculosis
- Silica exposure should be halted at an early stage in cases of radiographic appearances suggestive of silicosis

**Progression of silicosis in relation to silica dust exposure
Hessel et al. Ann occ Hyg 32: 689-696 Supplement 1, 1988.**

- 631 South African gold miners
- to describe the progression of silicosis
- to determine the effect of silica dust exposure on progression
- to determine whether continued exposure after onset affected progression
- to compare the dust exposures of those who developed PMF with those who did not

FINDINGS

- Average annual progression rate 0.2 minor categories – 92.4% progressed
- Silicotics exposed after onset were more likely to progress than those not exposed
- BUT after controlling for year of birth and age at onset this became not significant
- Older silicotics showed less progression than younger ones
- BUT they began with higher profusion

PMF

- Silicotics who developed PMF were similar up to onset
- But had had earlier onset of silicosis and higher cumulative dust exposure after onset
- CDE after onset remained statistically significant when controlled for age at onset
- Progression was suggestively higher -but not sig.- for those who developed PMF

SO?

- Uncomplicated silicosis is a progressive disease (not 'simple' but uncomplicated)
- even in the absence of further exposure
- but change in profusion decreased as the original profusion score increased (? like sheep in a field)
- CDE was positively and significantly associated with susceptibility to progress
- And the most important aspect of dust exposure as it related to progression was exposure after onset

CONCLUSION

- ‘On the basis of the data presented above it appears that the removal of silicotics from continued exposure will reduce the rate of progression of small opacities as well as the risk of developing PMF’
- There is no mention of tuberculosis in the published paper

FOR DAVID

- If it is Scandinavia it must be about a register!
- The Swedish Pneumoconiosis Register was set up in 1931 using the Johannesburg classification
- Ahlmark et al (1961) found no relationship between exposure after diagnosis and progression
- Westerholm (1980) concluded that an association existed and the causal nature was suggested but not proved

FOUR SOUTH AFRICAN STUDIES

- Libode, Thamaga, West Vaal, Lesotho
- These four studies have in common the fact that no use was made of extant medical records or radiographs
- In the case of the two pioneering studies carried out a long way from the mines and it was clearly not practicable to collect data from many mines
- In the case of the two later studies the men studied were all from the same mine and could be expected to have had regular medical examinations

Research questions – by implication

- In all the recent studies a similar prevalence of silicosis has been found
- regardless of whether the men had left the mine many years previously, or were long service current workers or had recently left the mine
- In none of these studies has there been any attempt to refer back to stored medical or radiological data
- All are cross-sectional studies

A METHODOLOGICAL ISSUE

- **In the studies from Brazil, South Africa and Sweden, which found an association, stored X-rays were used to determine the date of first radiographic evidence of silicosis**
- **In South African cross-sectional studies no distinction is made between those workers who have continued in dusty jobs after they have been diagnosed as silicotic and those who have no post diagnostic exposure**

STRATIFICATION AS CONFIRMATION OF VALIDITY

- **Cowie and van Schalkwyk (1987) claimed that the prevalence of radiological silicosis among Free State miners was about 1.36%**
- **Corbett, Murray et al (1999) showed that from stored radiographs and autopsy data the prevalence was 13.7% and 14.4% respectively**
- **Close agreement and approximately 10x the first estimate**
- **If the Cowie/van Schalkwyk sample is stratified by age or length of service the reason for the low prevalence becomes obvious**

Conclusion and research questions

- **No more cross-sectional studies – please**
- **Just how bad is the health of in-service gold miners in South Africa?**
- **Cohorts of working or ex-miners should be stratified by (at least) age, age at first exposure, age at last exposure, length of service, estimated cumulative dust exposure, presence or absence of tuberculosis and/or silicosis, and the time since either of these inter-related conditions was detected**
- **Experts should be asked to review key studies and critique them**

TWO OPINIONS – WIDELY SEPERATED IN TIME

- **‘A case of tuberculosis in a silica dust generating industry is like a typhoid carrier in a kitchen’. Any one of a number of writers – original reference mislaid – circa 1930.**
- **‘The social damage due to uncontrolled silica dust exposure is manifest as an epidemic of tuberculosis’. JCAD 2006.**