Occupational exposures and granulomatosis with polyangiitis: new findings by using a job exposure matrix

Solange Gonzalez Chiappe[1], Ann Knight[2], Alfred Mahr[1]

[1]Department of Rheumatology, Kantonsspital St. Gallen, St. Gallen, Switzerland
[2]Department of Rheumatology, Institute of Medical Sciences, Uppsala University, Uppsala, Sweden

Horizon 2020 European Union Funding for Research & Innovation

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20th International Vasculitis and ANCA Workshop 2022

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Background/Objectives

Environmental risk factors of granulomatosis with polyangiitis (GPA) disease are poorly known.
A study compared rates of selected occupations held by GPA cases and general population controls before an index date and did not find statistically significant results.
Aim was to increase the sensitivity of the previous study in capturing GPA occupational risk factors by replacing occupation titles with occupational exposures.

Methods

We used data from a Swedish study that identified 2,288 GPA cases and 22,883 general population matched controls. Among them, 468 cases and 4,296 controls had had occupations involving substantial exposure to inhaled particles or animals contacts before an index date.
Each of those occupations was converted into a list of exposures by using a job exposure matrix (Canjem).
Based on results of the previous analysis and literature review, some exposures and joint exposures were selected for further analysis. Their rates among cases and controls were compared by performing Chi-squared tests.

Conclusions

Six occupational exposures have been found to be associated with GPA onset when performing univariate analysis.
Failure to identify individual occupations as GPA risk factors may be related to probable dose-time effects and antagonist effects of exposures.
This exploratory analysis needs replication for confirmation as results were based on exposure probabilities and occupation codes approximations.

Results

None of the 32 occupations retained by Knight et al. was found to be associated with GPA onset. Borderline increased risks were nevertheless noted for bakers, paper workers and animal keepers (Fig1).

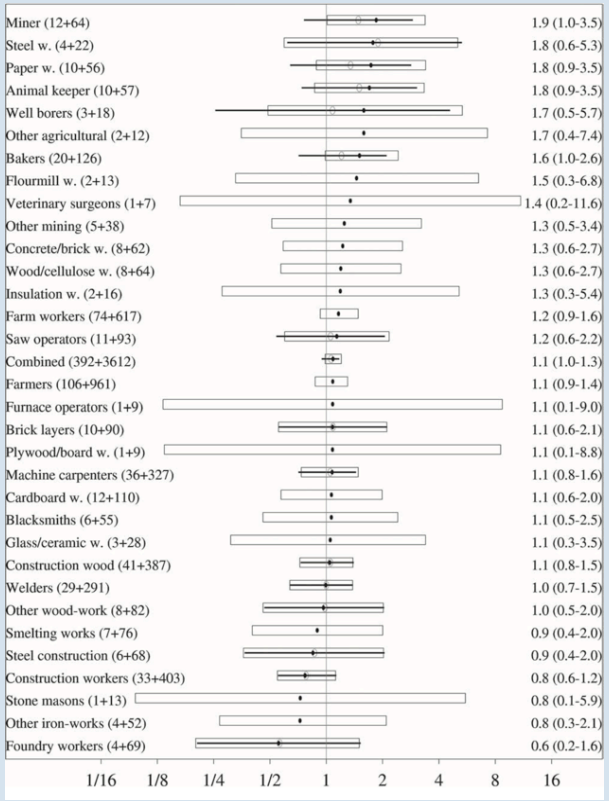

Fig. 1 Odd Ratios by occupations
Figure from Ann Knight et al. Ann Rheum Dis 2010

The 32 retained occupations exposed to 179 substances. Among them:

- 19 substances were selected for further analysis and
- 6 substances (below) were eventually found to be more frequent exposures among cases than among controls,
  - (1) organic dusts with high content of endotoxins,
  - (2) ammonia
  - (3) hydrogen sulfide
  - (4) wood combustion products
  - (5) pesticides and
  - (6) biocides.

Antagonist effects were suspected between crystalline silica and alumina and between lead compounds and organic solvents but the corresponding odd ratios were not statistically significant (Fig 2).

Substance	Cases (GPA)	Controls (Gen. Pop.)	OR	95% CI
Crystalline silica	219	2170	1.01	[0.87-1.17]
Crystalline silica without Alumina	33	256	1.29	[0.87-1.89]
Lead Compounds	309	2880	1.07	[0.95-1.23]
Lead Compounds without organic solvents	20	134	1.49	[0.88-2.41]
Organic dust with high endotoxin levels	207	1775	1.17	[1.01-1.38]
Ammonia	229	1946	1.20	[1.03-1.38]
Hydrogen sulfide	220	1899	1.16	[1.01-1.36]
Wood combustion products	120	985	1.23	[1.00-1.50]
Pesticides	193	1661	1.16	[1.00-1.38]
Biocides	192	1654	1.16	[1.00-1.37]
Cleaning agents	249	2235	1.11	[0.98-1.30]
Ionizing Radiation	22	146	1.51	[0.92-2.38]

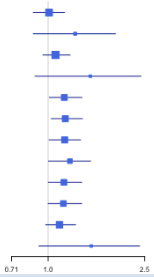

Fig. 2 Odd Ratios by exposures

"This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No. 813545"