Inhalation of ammonium nitrate fuel oil explosive (ANFO)

EDITOR,—Ammonium nitrate fuel oil (ANFO) is a granular solid used as a blasting explosive in metalliferous mining. Compressed air is used to propel ANFO from a keg by way of flexible hoses to drilling holes within rock.

I recently treated a miner who accidentally inhaled ANFO when the hose he was using to charge a face slipped out of a drill hole. He described the plume as consisting principally of vapour rather than dust as the kettle was almost empty at the time. He was not wearing a respirator. He experienced irritation of the eyes and throat, headache, nausea, chest tightness, cough, shortness of breath, and wheezing. An occupational health nurse who responded to the emergency call out recorded a respiratory rate of 20 and a blood pressure of 135/100. She administered oxygen and nebulised salbutamol, and then irrigated his eyes. These measures resulted in symptom relief. The miner then returned to see me 15 hours later with a recurrence of his respiratory symptoms. He was 40 years old and a current smoker, with no history of asthma or atopy. Examination showed widespread rhonchi but no cyanosis. His respiratory symptoms and rhonchi were relieved by nebulised salbutamol and then irrigated his eyes. These measures resulted in symptom relief. A previous report of ANFO inhalation.

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Effects of acute exposure to ultrahigh radiofrequency radiation on three antenna engineers

EDITOR,—Schilling reports the health problems of three men overexposed to ultrahigh frequency (UHF) TV radiation (785 MHz, >20 mW/cm² for 1–3 minutes). Their symptoms included immediate sensations of heating and pain, and later erythema lasting a few days. Two had diarrhea for one to three days. Subsequently all three had headaches, dysaesthesia, lassitude, and loss of stamina which slowly improved over some three years. Detailed reports of overexposure are helpful in understanding the effects of radiofrequency radiation on humans so I would like to make the following observations.

There is no comment about eye examinations yet induction of (posterior subcapsular) cataract has been well documented in animals exposed to UHF or microwave frequencies usually in excess of 100 mW/cm². Any findings, even negative ones, would be of interest given the anatomical differences between animal and human eyes and hence their likely differences in interaction with these wavelengths.

The persistent symptoms of lassitude, fatigue, and headache are of note in view of the debate about condition called “microwave sickness” (or neurasthenic syndrome) in eastern European publications and regarded with scepticism by some western authorities. The symptoms include headaches, sleep disturbances, weakness, impotence, chest pains, and poorly defined feelings of illness. There may also be changes in blood pressure and pulse rate. Schilling’s detailed report gives substance to the existence of microwave sickness and shows that it should not be dismissed as depression or hypochondriasis or post-traumatic stress disorder. The onset of diarrhoea in two of the men is suggested by Schilling to be due to heating of the bowel. However, the abdomen was largely shielded by the skip so I suggest that it was due to stimulation of the autonomic nervous system passing through the neck, which is similar to the mechanism postulated for other visceral effects—such as on the heart.

It is interesting that the men had persistent headaches and dysesthesias after exposure to their upper body. I have reported a series of people who developed upper body burning sensations on the side of the head when using a mobile phone (900 MHz) suggesting that lower level exposures may have similar effects on some people. It is postulated that the A delta (pain) and C (sympathetic) nerves produce these diverse effects and are susceptible to certain combinations of wavelengths and modulations.

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Author’s reply—I welcome the interest and comments from Hocking regarding my recent case report. Man A and man B, the two who were likely to have had the greatest exposure on the basis of their symptoms and signs and their position in relation to the antenna, had full ophthalmological examinations within a few months of the incident and no abnormalities were reported. As a result of Hocking’s enquiry I am arranging for them to have follow up examinations in the near future.

Hocking suggests that the abdomen was largely shielded by “the skip”. The skip was about 1 m deep and the edge of it was about at waist level. The three men were winched up to the live antenna panel and as they were winched up the skip tipped as it caught on the structure supporting the antenna panel so that it reached an angle of perhaps greater than 30°. Two men had to lean forward to free the skip from the transmission mast. As a result of this the abdomen above the waist and thus a substantial proportion of the large bowel is likely to have been exposed to radiofrequency radiation. I am, however, most interested in the suggestion that the diarrhoea may have been the result of stimulation of the autonomic nervous system passing through the neck.