Editorial

Chemical poisonings, new and old

Sporadic cases of chemical poisoning have occurred in Japan recently, and even though these cases are rare, this situation is not permissible. These cases involve not only newly identified types of poisoning, but also the reemergence of poisoning with known hazardous chemicals.

Recent examples of known types of poisoning are lead poisoning, lung cancer caused by exposure to beryllium, and bladder cancer caused by exposure to pigments containing o-toluidine.

Lead poisoning: In Japan, the transportation network infrastructure is aging, following the construction boom that occurred during the economic boom of the 60s and 70s, following World War II and the Korean War. Repairs are needed, especially to the Shinkansen railway and highway infrastructure. To repair the Tokyo metropolitan highway bridge beams, polishing of lead-containing anticorrosive paint must be performed by shot blasting, and this task is performed behind temporary walls constructed to prevent contamination of the area near the highway. However, following this project, several cases of lead poisoning were diagnosed by local physicians, who observed the classical symptoms described in textbooks. The risk of lead poisoning is well known, but preventive measures were unfortunately overlooked by the person in charge of occupational safety and health[1]. Risk assessment and risk communication between the sectors must have been insufficient.

Beryllium poisoning: Cases of lung cancer among alloy production plant workers were recently reported to the Labor Standards Inspection Office. Similar cases had been reported approximately 35 years ago, but the company altered the production line to prevent contamination of the working environment with inhalable particles by automating the task and enclosing the space. At this point, the problem was considered solved. However, workers performing the subsequent task of melting ingots in the electrical furnace have begun to suffer from lung cancer. The ingots contain less than 3% beryllium. As Japanese law controls only alloys containing more than 3% beryllium, the ingots are therefore exempt. Our preliminary measurements suggested that the local level of beryllium contamination of the air in the factory is too high.

o-Toluidine poisoning: Workers in factories that produce raw dyes and pigments applied to the Labor Standards Inspection Office to approve cases of bladder cancer as a work-related cancer. The factories use materials containing aromatic amines, including o-toluidine.

Recent examples of poisoning with newly identified hazardous chemicals are bile duct cancers, which were reported by workers at a printing factory.

Bile duct cancer in offset printing workers: The workers were employed at a small offset printing company that performs proof printing. Workers performed tasks including cleaning of rollers, which must be performed several times for each test printing. A certain amount of an organic solvent was used without sufficient protection, such as use of a respirator. Air contamination with the solvent was suspected to be extremely high near the breathing zone of the workers[2]. Of the 180 persons registered as workers in the printing department during the 11 previous years, 16 developed bladder cancer; of these, 7 have died. The individuals who developed bladder cancer were aged 25 to 46 yr (mean = 36). According to the Japanese Cause of Death Statistics, bile duct cancer is extremely rare in individuals under the age of 50. No cases of bile duct cancer were reported among the 89 office workers or sales persons. 1,2-Dichloropropane was suspected to be the chemical responsible[3].

To prevent occupational disease, the most important component of occupational health and safety management is risk assessment of chemicals used in the workplace. By controlling exposure to hazardous chemicals, these health problems will effectively be prevented. However, if the hazards of chemicals are unknown it is difficult to assess risk or plan measures to prevent related health problems. It is also difficult to recognize exposure-related health problems. In these situations, a system for surveillance of work-related disorders would be helpful. To determine the relationships between disorders and work situations, data on work history and exposure history are essential. Availability of detailed data will enable accurate analysis,

but the difficulty of ensuring cooperation from all reporters makes this unrealistic. Proper maintenance of job-exposure matrices will be helpful for recording the work performed and chemical exposure. Constructing and maintaining such a job-exposure matrix is a hurdle to be overcome in Japan.

References

1) JNIOSH https://www.jniosh.go.jp/publication/pdf/saigai_houkoku_2014_05.pdf.
2) Japanese Ministry of Health, Labour and Welfare http://www.mhlw.go.jp/stf/houdou/2r9852000002x6at-att/2r9852000002x6zy.pdf.
3) JNIOSH https://www.jniosh.go.jp/publication/pdf/gaiyou.pdf.

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