TOXICOLOGY OF DIETARY SUPPLEMENTS: A CASE STUDY

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Abstract: The use of dietary supplements has grown dramatically in the last decade. A large number of dietary and herbal supplements escape regulatory and quality control; components of these preparations are poisonous and may contain, among other toxins, heavy metals. Uncontrolled use of dietary and herbal supplements by special populations, such as the military, may therefore pose a health risk. Clinical symptoms are not always properly attributed to dietary supplements; patients often do not mention supplement use to their health care provider. Therefore a health risk estimate is hard to make on either the individual or the population level. A case study was performed on a host of preparations that were used by one single individual in the military. Both essential (chromium, copper, zinc and iron) and poisonous (arsenic, lead and nickel) trace elements were determined using inductively coupled plasma combined with optical emission spectrometry (ICP-OES) or with mass spectrometry (ICP-MS). Arsenic and lead were detected at exposure levels associated with health risks. These health risks were detected predominantly in hormone-containing supplements and the herbs & botanicals used for performance enhancement. To the extent that this is a representative sample, there is an underestimation of supplement use and supplement risk in the US military, if not in the general population. Since clinical symptoms may be attributed to other causes and, unless patients are specifically asked, health care providers may not be aware of their patients’ use of dietary supplements, a strong support of laboratory diagnostics, such as a toxicological screening of blood or urine is required. In addition, screening of the preparations themselves may be advised. Health care providers need to be aware of the potential risks and alert for excessive consumption of these and other supplements by their patients.

Keywords: Dietary supplements, herbal supplements, adverse effects, clinical toxicology, laboratory diagnosis, toxicology screening, quality control, essential metals, poisonous metals, arsenic, lead

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