Development of Aplastic Anemia and the Exposure to Stoddard Solvent

By David Prager and Charles Peters

It is very difficult to prove that an industrial or nonindustrial exposure to a chemical has an etiologic relationship to the development of aplastic anemia, especially when there are very few reported instances of such a relationship. Such a situation has presented itself and we, therefore, feel obliged to report this association: the development of aplastic anemia after prolonged exposure to Stoddard solvent.

Case History

A 41-year-old male was well until three months prior to admission, when he began to experience progressive tiredness, light-headedness, and increasing bruisingability. For the past 16 years, he worked as a heavy equipment mechanic and had frequent exposure to a chemical solvent called Solvasol #5 which is a Stoddard solvent.

On initial physical examination, the patient had some ecchymotic areas and diffuse petechiae. Palpable hepatomegaly and splenomegaly were not present. The initial hemoglobin was 7.9 Gm. per cent with a hematocrit of 22 volumes per cent. White count was 2000 per mm.3 with 18 per cent segmented cells, 77 per cent mature lymphocytes, 3 per cent atypical lymphocytes and 2 per cent monocytes. The platelet count was 9000 per mm.3 A sternal marrow was performed, but no marrow particles were found. Subsequently, a percutaneous bone biopsy of the ilium showed a markedly hypocellular bone marrow with a paucity of all cellular elements. The following pertinent studies were normal: buffy coat smear, leukocyte alkaline phosphatase, haptoglobin, fluorescent antinuclear antibody and thrombin test. Eleven months after the initial diagnosis, the patient was admitted in coma and died. Postmortem examination revealed diffuse intracerebral hemorrhage involving the right occipital lobe. The bone marrow exhibited a marked hypopcellularity with depression of all cellular components.

Discussion

In 1925, W. J. Stoddard and associates studied various petroleum distillates used in the dry-cleaning industry in order to develop a safe agent. The National Association of Dyers and Cleaners adopted the term "Stoddard solvent" for this particular product as a token of appreciation for the personal efforts of Stoddard. Nationally recognized specifications of Stoddard's solvent have been determined. Briefly, Stoddard solvent is a petroleum distillate that has...
a boiling range of 150–200° C (300–400° F). Because of its high boiling point, it cannot contain benzene (boiling point 80.1° C or 176.2° F) which is recognized as a myelotoxic chemical.2,4 Identification of the several hundred hydrocarbons present in Stoddard solvent has not been possible. To date, benzene and its derivatives have been unique among hydrocarbons in their myelotoxic property.5 The development of aplastic anemia and/or acute myelogenous leukemia after exposure to benzene derivatives is well appreciated and accepted.2,5 The lack of benzene in Stoddard solvent is the prime reason for not recognizing this solvent to possess myelotoxic properties. Generally, the higher-boiling-point hydrocarbons, such as those in Stoddard solvent, have not been associated with bone marrow depression.6 There have been, however, a few reported cases of aplastic anemia associated with exposure to these higher-boiling-point petroleum distillates, but not specifically in association with Stoddard solvent.6,8 Since all the hydrocarbons have not been identified in Stoddard solvent, it is conceivable that unknown myelotoxic substances could be present. Hopefully, this brief communication will initiate the reporting by others of aplastic anemia developing in patients exposed to Stoddard solvent. In this manner, the significance of such an association can be better appreciated and, if necessary, due precautions advised when working with this solvent.

REFERENCES

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