**Abstract**

**Background:** Pennyroyal is a widely available herb that has long been used as an abortifacient despite its potentially lethal hepatotoxic effects. However, quantitative data for pennyroyal constituents and their metabolites in humans have not been previously reported.

**Objectives:** To quantify pennyroyal metabolites in human overdose, to correlate these findings with clinical variables, and to place these findings in the context of previously reported cases of pennyroyal toxicity.

**Design:** Clinical case series of pennyroyal ingestions; quantification of pennyroyal metabolites by gas chromatography and mass spectrometry; qualitative detection of protein-bound adducts of the metabolites of pennyroyal constituents in human liver by Western blot assay; and review of the literature based on a search of MEDLINE, Index Medicus, and the reference citations of all available publications.

**Results:** We report four cases of pennyroyal ingestion. One patient died, one received N-acetylcysteine, and two ingested minimally toxic amounts of pennyroyal and were not treated with N-acetylcysteine. In the fatal case, postmortem examination of a serum sample, which had been obtained 72 hours after the acute ingestion, identified 18 ng of pulegone per mL and 1 ng of menthofuran per mL. In a serum sample from the patient treated with N-acetylcysteine, which had been obtained 10 hours after ingestion, the menthofuran level was 40 ng/mL. Review of 18 previous case reports of pennyroyal ingestion documented moderate to severe toxicity in patients who had been exposed to at least 10 mL of pennyroyal oil.

**Conclusion:** Pennyroyal continues to be an herbal toxin of public health importance. Data on human metabolites may provide new insights into the toxic mechanisms and treatment of pennyroyal poisoning, including the potential role of N-acetylcysteine. Better understanding of the toxicity of pennyroyal may also lead to stricter control of and more restricted access to the herb.
Correlation of Erythropoietic Toxicity with the Serum Concentration of Chloramphenicol Metabolites in Patients with Renal or Hepatic Insufficiency.
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*Annals of Internal Medicine;* 92 (5): 637-638

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