PEDIATRIC DENTISTRY/Copyright © 1988 by
The American Academy of Pediatric Dentistry
Volume 10, Number 4

Bleomycin therapy: a contraindication to the use of nitrous oxide-oxygen psychosedation in the dental office

Padraig Fleming, BDentSc, FDS, MS Paul O. Walker, DDS, MSD
Jack R. Priest, MD

Abstract

Bleomycin, an anti-neoplastic antibiotic, is frequently used in combination with other anti-cancer therapy in the treatment of malignant germ cell tumors and malignant lymphomas, including Hodgkin's disease. Patients who are receiving or have received bleomycin therapy are at increased risk of developing pulmonary toxicity if administered oxygen, and the resulting interstitial pneumonitis may be fatal. Nitrous oxide-oxygen psychosedation should not be used in patients who have received such therapy because of the high oxygen content of the gases used in the inhalation sedation technique.

Because of its safety and effectiveness, nitrous oxide-oxygen psychosedation is widely used in dentistry to alleviate patient fear and anxiety concerning dental treatment. It has been estimated that inhalation sedation with nitrous oxide-oxygen is used by approximately 30,000 dentists in the United States (Jones and Greenfield 1977). Scavenging of waste gases has been advised (Jones and Greenfield 1977; Brodsky 1983) because increased general health problems have been reported to occur in dental office personnel chronically exposed to trace concentrations of nitrous oxide (Cohen et al. 1980). Some relative contraindications to the use of nitrous oxide-oxygen psychosedation in dental patients include nasal obstruction, pregnancy (first trimester), epilepsy, and psychosis (Allen 1981). The question of oxygen toxicity has been stated not to be a problem with nitrous oxide-oxygen psychosedation (Allen 1981).

Bleomycin is an anti-neoplastic antibiotic (American Society of Hospital Pharmacists 1987) and is used as an adjunct to surgery and radiation therapy in the treatment of certain neoplasms, most commonly malignant germ cell tumors and malignant Hodgkin's and non-Hodgkin's lymphomas.

The most serious toxic effect of bleomycin is interstitial pneumonitis which occurs in approximately 10-20% of patients receiving the drug (American Society of Hospital Pharmacists 1987). This may progress to pulmonary fibrosis which results in the death of approximately 1% of patients receiving bleomycin. Although pulmonary toxicity most frequently occurs in older patients and in those receiving high doses of bleomycin, it is more likely in patients who have also received chest radiation. Toxicity is unpredictable and may develop in younger patients and with low-dose therapy. Because of this effect on lung tissue, patients who have received bleomycin are at increased risk of developing pulmonary toxicity when administered oxygen. If such patients must undergo surgery, it is advised that the oxygen concentration be maintained as low as 25% during surgery and during the postoperative period (Goldiner et al. 1978).

The majority of dental patients reach a desirable level of psychosedation at a concentration of 30% nitrous oxide and 70% oxygen. However, individual concentrations must be varied for each patient and some require as much as 50% nitrous oxide and 50% oxygen to respond appropriately (Trieger 1974). The high oxygen concentrations used in the inhalation sedation techinique may result in lung damage in patients undergoing bleomycin therapy. It is recommended, therefore, that patients who are on bleomycin therapy should not undergo nitrous oxide-oxygen psychosedation for dental treatment.

Dr. Fleming is tutor/registrar, School of Dentistry, Royal Victoria Hospital and the Queen's University, Belfast, Northern Ireland; Dr. Walker is director, Hospital Dental Clinic, University of Minnesota; and Dr. Priest is director, Oncology Clinic, Children's Hospital, St. Paul, Minnesota. Reprint requests should be sent to: Dr. Paul O. Walker, Director, Hospital Dental Clinic, University of Minnesota, School of Dentistry, Malcolm Moos Health Sciences Tower, 515 Delaware St. S.E., Minneapolis, MN 55455.

Allen GD: Dental Anesthesia and Analgesia (Local and General), 3rd ed. Baltimore; Williams and Wilkins, 1981.

American Society of Hospital Pharmacists: American Hospital Formulary Service Drug Information 87. Bethesda, Maryland; American Society of Hospital Pharmacists Inc, 1987.

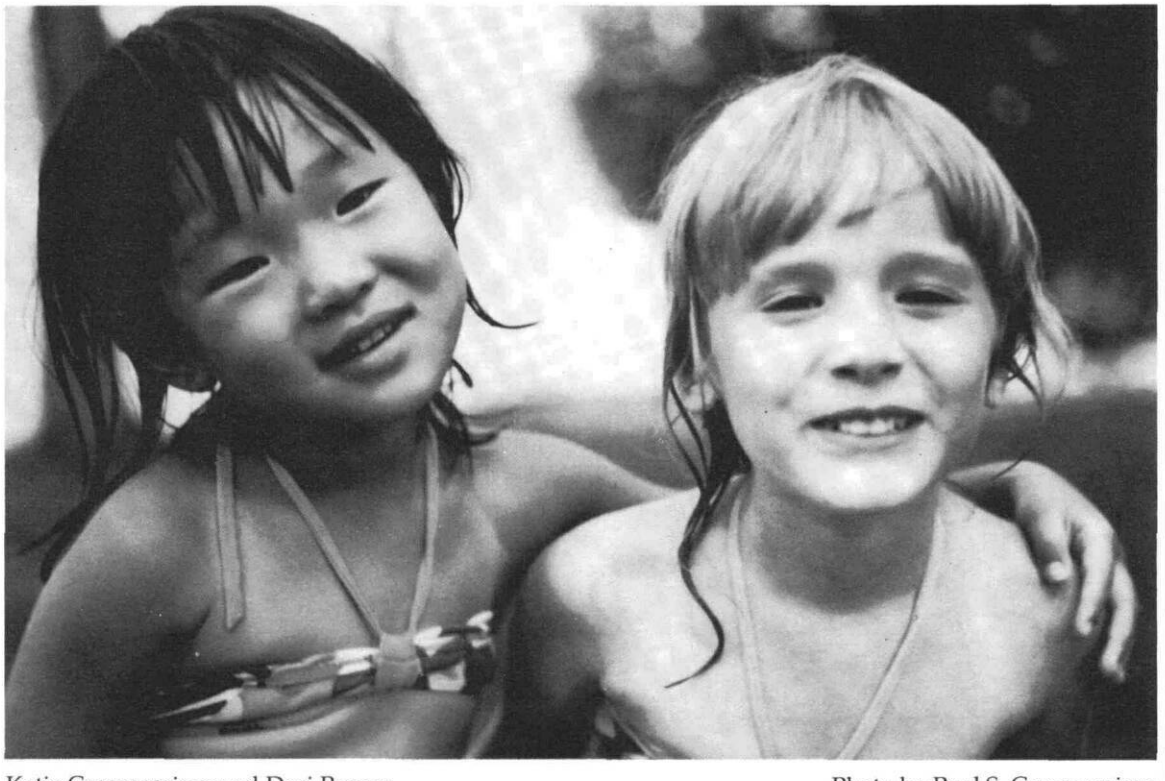
Brodsky JB: The toxicity of nitrous oxide. Clin Anaesthesiol 1:455-67, 1983.

Cohen EN et al: Occupational disease in dentistry and chronic exposure to trace anesthetic gases. J Am Dent Assoc 101:21-31, 1980.

Goldiner PL et al: Factors influencing postoperative morbidity and mortality in patients treated with bleomycin. Br Med J 1:1664-67, 1978.

Jones WT, Greenfield W: Position paper of the ADA Ad Hoc Committee on Trace Anesthetics as a potential health hazard in dentistry. J Am Dent Assoc 95:751-56, 1977.

Trieger N: Pain Control. Berlin; Quintessenz, 1974.



Katie Casamassimo and Dori Pogers Photo by Paul S. Casamassimo