

Format: Abstract

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### Adverse effects of nitrous oxide.

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#### Abstract

Although once considered completely devoid of complications, it is now recognised that the misuse or inappropriate use of nitrous oxide (N2O) often results in adverse side effects. Hypoxia, particularly the entity 'diffusion hypoxia', can occur with the administration of inadequate amounts of oxygen during or immediately after a N2O anaesthetic. N2O will diffuse into air-containing cavities within the body faster than nitrogen diffuses out. This results in a temporary increase in either the pressure and/or volume of the cavity depending upon the distensibility of its walls. The magnitude of the effect is proportional to the blood supply of the cavity, the concentration of N2O inhaled and the length of time the patient is exposed to N2O. Significant morbidity or even death can result from this phenomenon. A property unique to N2O is its ability to oxidise and inactivate the vitamin B12 components of certain enzymes in both animals and man. One such enzyme, methionine synthetase is essential for normal DNA production. Animal and human studies have demonstrated that the haematological, immune, neurological and reproductive systems are each affected. These adverse effects of N2O can occur after both acute (surgical) or long term (occupational) exposure to the gas. Because of its effects on the pressure and volume characteristics of air-containing spaces, N2O should not be used for patients with bowel obstruction, pneumothorax, middle ear and sinus disease, and following cerebral air-contrast studies. Many anaesthesiologists feel that use of N2O should be restricted during the first two trimesters of pregnancy because of its effects on DNA production and the experimental and epidemiological evidence that N2O causes undesirable reproductive outcomes. Since N2O affects white blood cell production and function, it has been recommended that N2O not be administered to immunosuppressed patients or to patients requiring multiple general anaesthetics. Many anaesthesiologists believe that the potential dangers of N2O are so great that it should no longer be used at all for routine clinical anaesthesia. However, the continued use of N2O remains a controversial topic since, at present, a suitable substitute gas is not available.

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