



Oral Anxiolysis

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Introduction

Phobia is defined as a persistent, irrational fear of a specific object, activity, or situation that leads to a compelling desire to avoid it. Anxiety is a state of uneasiness and apprehension, as about future uncertainties. Dental phobia is a common occurrence usually originating in childhood and continuing throughout life. In the United States, between 6 and 14% of the population (14-34 million people) avoid seeking dental care because of their fear of dentistry (1,2). Also, Smith found over the last 50 years that dental fear among the population has remained constant (3). Women in their mid-thirties to mid-forties and men in their twenties experienced the most anxiety before endodontic treatment (4). Finally, Dionne et al. found that in the US 18% of adults would seek dental care more frequently if they were given a drug to make them less nervous (1). Along with pain control, anxiolysis, which is a reduction in anxiety, can be an important part of dental care. It has been found that an anxiolytic or hypnotic drug taken 1 hour before sleep the evening before the dental appointment can help ensure a good night's sleep and a more stress-tolerant patient during treatment (2). Oral anxiolysis involves a minimally depressed level of consciousness, produced by a pharmacological method that retains the patient's ability to independently and continuously maintain an airway and respond normally to tactile stimulation and verbal command. Although cognitive function and coordination may be modestly impaired, respiratory and cardiovascular functions are unaffected (5). This clinical update reviews the most common oral anxiolytic medications used in dentistry.

Diazepam (Valium) (2,6)

Usual Dose: 5-10 mg night before dental appointment and 5-10 mg 1 hour before dental appointment
Onset of action: 90% of clinical effect within 1 hour
Time to peak serum concentration: 0.5 – 2 hours
Cardiovascular: Hypotension, vasodilation
Central Nervous System: Drowsiness, amnesia, memory impairment, headache, depression, confusion
Gastrointestinal: Constipation, diarrhea, nausea, xerostomia
Respiratory: Decrease in respiratory rate, apnea, asthma
Half-Life: 20-50 hours; active major metabolite (desmethyldiazepam) 50-100 hours

Triazolam (Halcion) (2,6)

Usual Dose: 0.25 mg taken evening before dental appointment and 0.25 mg 1 hour before dental treatment
Onset of action: 15-30 minutes
Time to peak serum concentration: 2 hours
Duration: 6-7 hours
Central Nervous System: Drowsiness, headache, dizziness, nervousness, lightheadedness,
Gastrointestinal: Nausea, vomiting
Half-Life: 1.5-5.5 hours

Advantages

- Ease of administration
- Low cost
- No special delivery equipment required
- Lower incidence of adverse reaction
- Reduced severity of adverse reactions (2)

Disadvantages

- Reliance on patient compliance
- Prolonged latent period
- Erratic and incomplete absorption of drugs from the gastrointestinal tract
- Inability to titrate
- Inability to readily lighten or deepen the level of sedation
- Increased duration of action (2)

Contraindications

Include: allergy, psychoses, acute narrow angle glaucoma (may increase intraocular pressure), pregnancy (benzodiazepines cross the placental barrier), breast feeding (benzodiazepines are excreted in breast milk), liver dysfunction (2,6)

Mechanism of Action

Benzodiazepines have depressant effects on subcortical levels of the central nervous system. The specific anxiolytic effect is a result of their actions on the limbic system and thalamus. Those areas of the brain are involved with emotions and behavior. Benzodiazepines have been called "limbic system sedatives" because they impair neuronal discharge in the amygdala and amygdala-hippocampus nerve transmission (2). Benzodiazepines bind to Gamma-aminobutyric acid (GABA) receptors in the CNS. GABA is the major inhibitory neurotransmitter in the central nervous system. Upon activation on the post synaptic membrane, the GABA receptor selectively conducts chloride through its channel causing hyperpolarization or an increase in ion conductance that prevents depolarization, thereby inhibiting neuronal activity (7). Benzodiazepines bind to sites on the GABA receptor complex. This binding facilitates GABA action increasing the frequency at which chloride channels open in response to GABA (6,8).

Pharmacological Effects

Respiratory System: All sedative-hypnotics and anxiety drugs, including benzodiazepines, are potential respiratory depressants. In normal doses, benzodiazepines have little effect on respiration in healthy individuals (8).

Cardiovascular System: Following oral administration to a healthy ASA I (American Society of Anesthesiologists) patient benzodiazepines produce virtually no changes in cardiovascular function (2).

Absorption, Metabolism, Excretion

All benzodiazepines, when taken orally, are absorbed fast and reliably thru the GI tract (2). They undergo first pass metabolism and

biotransformation in the liver. Pharmacologically active metabolites, with extensive half-lives, can exist during benzodiazepine metabolism. Excretion of all benzodiazepines occurs in the feces and urine (2).

Drug Interactions

Patients should be advised against the concurrent use of benzodiazepines and other CNS depressants. This includes alcohol, opioids, barbiturates, monoamine oxidase (MAO) inhibitors, and other anti-depressants (2).

Warning

Due to its long-acting metabolite, diazepam is not considered a drug of choice for the elderly; long-acting benzodiazepines have been associated with falls in the elderly (6). Aggression and fear are held in check by fear and anxiety. Due to disinhibition from benzodiazepines, hyperactivity or aggressive behavior in adolescents or psychiatric patients can increase (2). Patients must be advised against driving a motor vehicle or operating hazardous machinery for at least 24 hours. For medicolegal purposes, this should be documented in the patient's record. Failure to warn a patient about this potential hazard may lead to legal action should a problem develop before or after treatment. Morland noted an increased risk of traffic accidents with the use of benzodiazepines. The risk was highest when benzodiazepine treatment started and there was a greater risk associated with the use of benzodiazepines with a long half-life (9). Also noted in another study by Engeland et al. was an increased risk of traffic accidents when benzodiazepines were taken for up to seven days. This was noted to decrease after a period of two weeks due to the potential tolerance development to the drug effects or decreased usage (10).

Monitoring

In addition to the dentist, at least one additional person trained in Basic Life Support must be present. Along with the proper personnel, a positive-pressure oxygen delivery system must be immediately available for the patient (5). A dentist, or at the dentist's direction, an appropriately trained individual, must remain in the operatory during active dental treatment to monitor the patient continuously until the patient is discharged (5). The appropriate monitors are applied as per state regulation. Commonly, these include pulse oximeter and a blood pressure cuff. Vital signs should be monitored and recorded every 5 minutes. If deemed capable of being discharged in the company of a responsible adult, the escort is brought into the treatment room where the postoperative instructions are read and then a copy is given to both the patient and the escort.

Conclusion

Oral anxiolytic medications are prevalent in the general population. Surveys indicate that approximately 15% of adults in the US take one of the benzodiazepines at least once a year (8). The use of anxiolytic medications does not reduce the need for local anesthetics during dental procedures. Lindmann et al. found that the use of 0.25 mg triazolam for conscious sedation in a patient with irreversible pulpitis in a mandibular posterior tooth neither improves the success rate of the inferior alveolar nerve block nor eliminates the need for profound local anesthesia (11). A Navy study by Ehrich et al. compared a single dose of 0.25 mg triazolam with 5 mg of diazepam. The 0.25 mg of triazolam was determined to be more effective at reducing the patient's anxiety (12). Oral benzodiazepines may be used safely and successfully to provide minimal to moderate levels of anxiolysis appropriate for the relief of mild to moderate degrees

of apprehension and anxiety. When used appropriately, these drugs can be very safe and effective in the management of anxious patients.

BUMEDINST 6710.67B (dated 13JUN08) should be reviewed prior to performing anxiolysis.

References

1. Dionne RA, Gordon SM, McCullagh LM, Phero JC. Assessing the need for anesthesia and sedation in the general population. *J Am Dent Assoc* 1998;129(2):167-173.
2. Malamed SF, Sedation: a guide to patient management 5th ed. St. Louis, Missouri: Mosby, 2010.
3. Smith TA, Heaton LJ. Fear of dental care: are we making any progress? *J Am Dent Assoc* 2003;134:1101-8.
4. Peretz B, Moshonov J. Dental anxiety among patients undergoing endodontic treatment. *J Endod* 1998;24:435-7.
5. ADA Guidelines for the use of sedation and general anesthesia by dentists: as adopted by the October 2007 ADA House of Delegates. http://www.ada.org/sections/about/pdfs/anesthesia_guidelines.pdf
6. Wynn RL, Meiller TF, Crossley HL. Drug information handbook for dentistry 16th ed. Hudson, Ohio: Lexi-Comp, 2010.
7. Sikka PJ. Basic Pharmacologic principles. In: Stoelting RK, Miller RD, Basics of anesthesia 5th ed. Philadelphia, PA: Churchill Livingstone, 2007:37-48.
8. Giovannitti JA, Moore PA. Sedative-hypnotics, antianxiety drugs, and centrally acting muscle relaxants. In: Yagiela JA, Dowd FJ, et al. Pharmacology and therapeutics for dentistry. 6th ed. St. Louis, Missouri: Mosby, 2011:188-211.
9. Morland J. Driving under the influence of non-alcohol drugs. *Forensic Sci Rev* 2000;79:79-105.
10. Engeland A, Skurtveit S, Morland J. Risk of road traffic accidents associated with prescription drugs. *Ann Epidemiol* 2007;17:597-602.
11. Lindmann M, Reader A, Nusstein J, Drum M, Beck M. Effect of sublingual triazolam on the success of inferior alveolar nerve block in patients with irreversible pulpitis. *J Endod* 2008;34:1167-1170.
12. Ehrich DG, Lundgren JP, Dionne RA, Nicoll BK, Hutter JW. Comparison of triazolam, diazepam, and placebo as outpatient oral premedication for endodontic patients. *J Endod* 1997;23:181-4.

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