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Clinical observation utilizing morphine sulfate and hydroxyzine pamoate for sedating apprehensive children for dental procedures: a nine-year report

Howard S. Schneider, AB, DDS, MSD

Abstract

*There are few reports in the dental literature of the use of morphine sulfate in sedating a child. The findings of this 9-year study using morphine sulfate and hydroxyzine pamoate for the treatment of apprehensive and fearful children justify further investigation into its use. A total of 4363 uses of the agents were recorded between July, 1975, and June, 1984. Where any abnormal response to the medication was seen, an incomplete medical history had been given at the time of examination. Morphine sulfate should be considered as an alternative to meperidine hydrochloride and alphaprodine hydrochloride.***

Premedication is as much an art as a science and this is reflected by the many drugs or combinations of drugs which have been reported.[1] Premedication focuses on the relief of anxiety and pain during the dental procedure. Perhaps the most important factor in deciding which drugs or techniques to use is past experience with the agent.[2]

The American Academy of Pediatric Dentistry has set forth the following guidelines for elective use of conscious sedation: "The primary goal must be the welfare of the patient; the second, control of patient movement to enable the practitioner to provide quality treatment; third, the patient arrives and leaves in a state of consciousness that is as close to normal for that patient as possible; and fourth, the production of a positive psychological response to treatment."[3]

The purpose of this paper is to report a 9-year experience (July, 1975, through June, 1984) observing 4363 children who were treated with morphine sulfate (deep IM) and hydroxyzine pamoate[a] (oral suspension) to alleviate apprehension during extensive dental procedures.

** Alphaprodine is no longer manufactured.

[a] Vistaril—Pfizer Laboratory Division: New York, NY.

Literature Review

The dental literature hardly mentions the use of morphine sulfate for dental procedures.[4,5] Yet many articles appear in medical journals describing the use of morphine for the sedation of children for surgical procedures.[6-11]

The use of hydroxyzine pamoate has been well documented in the dental literature.[12-15] Kopel's double-blind study with apprehensive children using oral hydroxyzine pamoate produced results closely approximating those of an ideal drug for the premedication of the apprehensive patient.[16]

Morphine is a potent, centrally active analgesic which is derived from the milky exudate of the poppy plant *Papaver somniferum*. Morphine and its derivatives interact with stereospecific and saturable binding sites, or receptors, in the brain and other tissues. Morphine induces drowsiness, changes in mood, and mental clouding as well as analgesia. The analgesia occurs without loss of consciousness. Nausea, however, may be an unpleasant side effect.

Dosages of morphine above normal levels may result in convulsions in patients without a previous history of convulsions. Thus morphine should not be given to patients with a history of seizures. Repeated use of morphine results in additive potential. There also is respiratory depression resulting from morphine. Ninety per cent of morphine is excreted in the urine the first day, but traces have been observed for as long as 48 hr.

The administration of hydroxyzine pamoate results in suppression of activity in subcortical areas of the central nervous system. Hydroxyzine pamoate is a chlorobenzhydryl piperazine derivative which is absorbed in the gastrointestinal tract; results may be seen within 45 min with peak action at 1 hr. Hydroxyzine pamoate may potentiate meperidine hy-

TABLE 1. Premedication for Children*

Age (years)	Morphine Sulfate (mg)	Amount (cc)	Weight (lbs)
1	1	0.075	20
1½	1.5	0.100	26
2	2	0.150	30-35
3	3	0.200	30-35
3½	3.5	0.230	30-35
4	4	0.240	35-40
5	5	0.330	40-60
6	6	0.400	40-60
7	7	0.450	40-60
8	8	0.500	60-90
12-Adult			90-150

* If Vistaril is used, cut morphine sulfate doses by ⅓. If Demerol is used, use 1 mg/lb of body weight; *Do not give* more than 100 mg/dosage. If morphine sulfate is used, use 1 mg/year of age, provided that patient IS NOT UNDER WEIGHT. If Nembutal is used instead of Demerol, use 10 mg/lb of body weight rectally in suppository form. *LORFAN* (Roche) 0.1 mg/Lorfan/1 mg morphine is *Antidote*. Courtesy, Sanchez Salazar, A.A., M.D., Chief, Department of Anesthesiology, Hope Haven Children's Hospital, 1964-70. Narcan is now the accepted antidote.

drochloride[b] and barbiturates. Therefore, the dosages of the drug should be adjusted in conjunction with the narcotic used. Drowsiness is a major side effect of hydroxyzine pamoate, but the effects of single dosages disappear in 2-6 hr. Hydroxyzine pamoate apparently suppresses some of the hypothalamus nuclei and extends its effect peripherally in the sympathetic portion of the autonomic nervous system.

Sedation of the type discussed in this report should be attempted only by those adequately trained according to the ADA Guidelines for Teaching Pain and Anxiety Control. The original premedication formula used from 1967 until June, 1975, was morphine sulfate, scopolamine, and hydroxyzine pamoate. However, scopolamine was discontinued in June, 1975, since the necessity of its use was questioned for the patient who was not given a general anesthetic. Further, it was a convulsive drug which could potentiate the convulsive activity of morphine sulfate.

Methods and Materials

This clinical study had no controls and the findings represent the observations of the author. The factors which distinguish this report from standard research methods and scientific reports are noted in the discussion section of the paper.

The premedications used were morphine sulfate, supplied in 20 ml vials (15 mg/ml), and hydroxyzine pamoate, supplied in pint bottles (20 mg/5 ml, Table 1).

Morphine sulfate was dispensed by a 1 cc tuberculin syringe via a 25 g ⅝ needle and injected in the deltoid muscle (deep IM). Hydroxyzine pamoate was given orally using a medication dispensing tube calibrated in teaspoons. The determination to sedate was based on patient apprehension and extent of dentistry needed (time required for treatment to be greater than 1 hr).

The premedications were used in the mentally retarded child, in victims of cerebral palsy, Down's syndrome, and sickle cell anemia, as well as the apprehensive child with a normal medical history.

The medical history was designed to detect prior heart or kidney disorders, cerebral imbalance, and seizure episodes. Where a physical disorder existed, a medical examination was required before treatment. When indicated, a medical examination was requested, stating premedication to be given, and requesting a statement of permission signed by the examining physician. The parent (guardian) was given premedication instructions which included: (1) nothing by mouth 3 hr prior to sedation; (2) a record of the child's having had a bowel movement and urinating within 24 hr; and (3) discontinuation of any medication the child was taking and/or approval by the physician prior to sedation. If there was illness or a fever the treatment was delayed.

The patients were presented for treatment 1 hr before the scheduled procedure at which time their weight was recorded. They were then placed in a "sedation room" (designed with bed, oxygen, suction, and a chair for the parent who remained with the child until treatment). The patients were given 1 teaspoon hydroxyzine pamoate (25 mg) if younger than 2 years of age, and 2 teaspoons (50 mg) if older than 2 years of age. Morphine sulfate was given deep IM (deltoid muscle) 30 min following the administration of hydroxyzine pamoate.

The dosage of morphine sulfate was calibrated by determining the age-to-weight ratio and then reducing the morphine by ⅓ of the required dosage. It should be pointed out that if the child is 4 years of age, but his weight is that of a 2 year old, then the morphine is calculated for a 2 year old as 2 mg before being reduced by ⅓.

The younger children were secured on a Papoose Board®. The older children were restrained with a seatbelt fastened around the waist, the arms remaining free.

If the patient became restless as treatment progressed to the point of interfering with the treatment, the following choices of action were considered: (1) give 1 mg additional morphine sulfate deep IM in the deltoid muscle; (2) support the medication with nitrous oxide; (3) give 1 mg additional morphine sulfate and nitrous oxide; or (4) discontinue treatment and reschedule the patient. The decision as to which approach to consider depended on the apprehension of the child and the amount of treat-

[b] Demerol—Winthrop Labs: New York, NY.

TABLE 2. Morphine Sulfate and Hydroxyzine Pamoate. Total Treated Cases July, 1975–June, 1984*

Morphine Sulfate (mg)	Age 1	2	3	4	5	6	7	8	9	10	11	12	13	14 (Over)	Total Cases†
1	141	79	27	2											249
2	32	518	191	43	4	1									789
3	2	31	380	176	75	23	14	11	2	2	2				718
4		15	16	464	430	385	227	251	133	67	53	3	8	9	2061
5				19	42	12	24	19	46	65	91	67	48	110	543
6											1	1	1		3
Totals	175	643	614	704	551	421	265	281	181	134	147	71	57	119	4363
Hydroxyzine Pamoate (mg)	**Age 1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14 (Over)**	**Total Cases†**
25	175	643													818
50			614	704	551	421	265	281	181	134	147	71	57	119	3545
Total	175	643	614	704	551	421	265	281	181	134	147	71	57	119	4363

* Morphine sulphate, hydroxyzine pamoate, and scopolamine were used from 1967 until June, 1975.
† By dosage.

ment remaining. The child was considered to be "restless" when uncontrollable movement and screaming occurred. A continued monotone cry was sometimes experienced, but was not of concern in treating the child. Although parents were discouraged from being in the treatment room, exceptions sometimes were made, especially in the case of the very young child where parental presence offered security in the initial stage of sedation and treatment.

Results

A total of 4363 children were sedated for dental treatment between July, 1975, and June, 1984 (Table 2). Four-year-old children constituted the largest single group that was sedated (704 sedations). The next larger group included 2-year-old children with 643 total sedations. Although the amount of morphine sulfate given in these age groups was reduced by ⅓, some children received an additional 1 mg as reflected in the number of children in the 1- through 4-year age group where amounts given were equal to the age of the child. As the age increased, less morphine was given per age and weight.

Three older patients required a total of 6 mg of morphine. The largest deviation in mg of morphine sulfate given per age was with 2-year-old children, where 15 patients received 4 mg. The patient's total body weight and apprehension accounted for this deviation. Where less morphine sulfate was given per age (in 3- to 6-year-old children) body weight again was the determining factor. Sedation of the 8- to 14-year-old age group reflected apprehension and/or surgical procedures more often than the length of an operative procedure.

The hydroxyzine pamoate dosage remained consistent. Patients 2 years of age and younger received 25 mg (1 teaspoon) and those over 2 years of age received 50 mg (2 teaspoons). Vomiting was observed infrequently. When vomiting did occur, however, the preoperative instructions had not been followed and the child had eaten prior to treatment. Only 1 case of vomiting persisted for any length of time, the patient having had a constant "gag" reflex for several hours. A few patients exhibited hyperactivity after treatment, and if this persisted, hydroxyzine pamoate was prescribed for rest at home.

There were 5 cases of convulsive activity during treatment. Three of the patients were 3 years old and 2 were 4 years old. In each case, a normal medical history had been recorded. An extensive follow-up medical examination of these children revealed 4 who had past histories of seizures and 1 child who was diabetic. Emergency procedures were used in these cases as outlined by the American Heart Association's Guidelines on Advanced Cardiac Life Support (ACLS). An emergency rescue team was notified in 4 of the cases for follow-up examination in the office even though the convulsion was of short duration and the patient was responsive. The 4 patients then were referred to a physician for extensive examination. An isolated case resulted in prolonged seizures and this patient was taken to a hospital emergency room for treatment and observation. During an extensive patient history the parent revealed that the child "jerked" all the time. The inability of this parent to recognize a seizure had resulted in the assessment of a normal history at the time of the dental treatment.

Experience and observation by the author suggest that results showed this type of sedation worked best in the 3- to 7-year-old age group. Many of the children fell asleep during treatment, while others

remained quiet, yet responsive to questioning. Routinely, 1- and 2-year-old children were quiet until treatment started. The children then might cry, but showed little movement during treatment. Premedication was more difficult to effect with the older child, especially when apprehension was more intense.

Discussion

Meperidine hydrochloride and alphaprodine hydrochloride[c] are 2 presently accepted narcotic drugs used for sedation in dentistry.

Morphine sulfate previously has not been reported in the literature for use in dentistry. The use of this narcotic raises the pain perception threshold and produces, as well, an analgesic effect resulting in emotional tranquility. The state of euphoria experienced with morphine is much greater than that resulting from meperidine hydrochloride and alphaprodine hydrochloride. It takes a larger quantity of the latter drugs to increase the euphoric effect. One may reach and even surpass the recommended dosage and not achieve the state of analgesia which morphine sulfate provides within its recommended dosage level.

Hydroxyzine pamoate results in tranquilizing the patient, produces a synergistic effect when combined with a narcotic, acts as an antiemetic agent, and also has few and short-acting side effects. As a result, when hydroxyzine pamoate is combined with a narcotic, the amount of narcotic given should be reduced. Since hydroxyzine pamoate lowers the seizure threshold, it is not recommended for the patient who has a history of seizures.

Consideration must be given to the local anesthetics used in dentistry. Goodson and Moore[17] reported the interaction of drugs and local anesthetics that resulted in severe reactions. Lidocaine hydrochloride suppresses respiratory depression in small dosages, but may enhance seizure activity when given in amounts exceeding the recommended level.

Therefore, 3 possible reasons for seizure activity exist in the sedated child. First, oversedation with the narcotic results in respiratory depression which is followed by hypoxia and finally seizures; second, the use of hydroxyzine pamoate in the child with a history of seizures; and third, the use of excessive lidocaine hydrochloride.

Another possibility for hypoxia in children while undergoing dental procedures has been reported by Mueller and Drummond.[18] Using the pulse oximeter, they recorded the oxygen saturation in patients during dental procedures. As the child became restless, it was noticed that there was a change in oxygen saturation in the blood, thus producing hypoxia even though no clinical signs were present. The clinical diagnosis was that of restlessness, which suggested supplementary anesthesia (local) was needed, or additional sedation rather than treatment of the undiagnosed hypoxic effect. It was found, however, that the hypoxic reaction resulted from the positioning of the patient during the dental procedure, when airway obstruction resulted in less oxygen intake. Thus, correction of the patient's position reversed the hypoxic effect.

The 5 patients recorded in this report who experienced seizures during treatment all had previous seizure history. The parent's inability to recognize a seizure and failure to give a thorough medical history resulted in the omission of this fact in the original medical questionnaire. It is difficult, therefore, to determine the predominant cause of the seizure.

Apart from this, the fact that morphine sulfate was used in recommended dosages and also that problem cases were eliminated before treatment may account for the success rate that was recorded.

It is acknowledged in this clinical evaluation that there are several factors which differentiate the findings from those of research methods and scientific reports. These factors include: (1) not recording the percentage of nitrous oxide to oxygen used; (2) not recording the amount of lidocaine hydrochloride used; (3) not recording the number of cases of vomiting; (4) not using a pulse oximeter to record oxygen level in the blood; and (5) not classifying the depth of sedation for each patient.

When used in recommended dosages, morphine sulfate may be considered as a drug of choice in dental procedures.

Conclusion

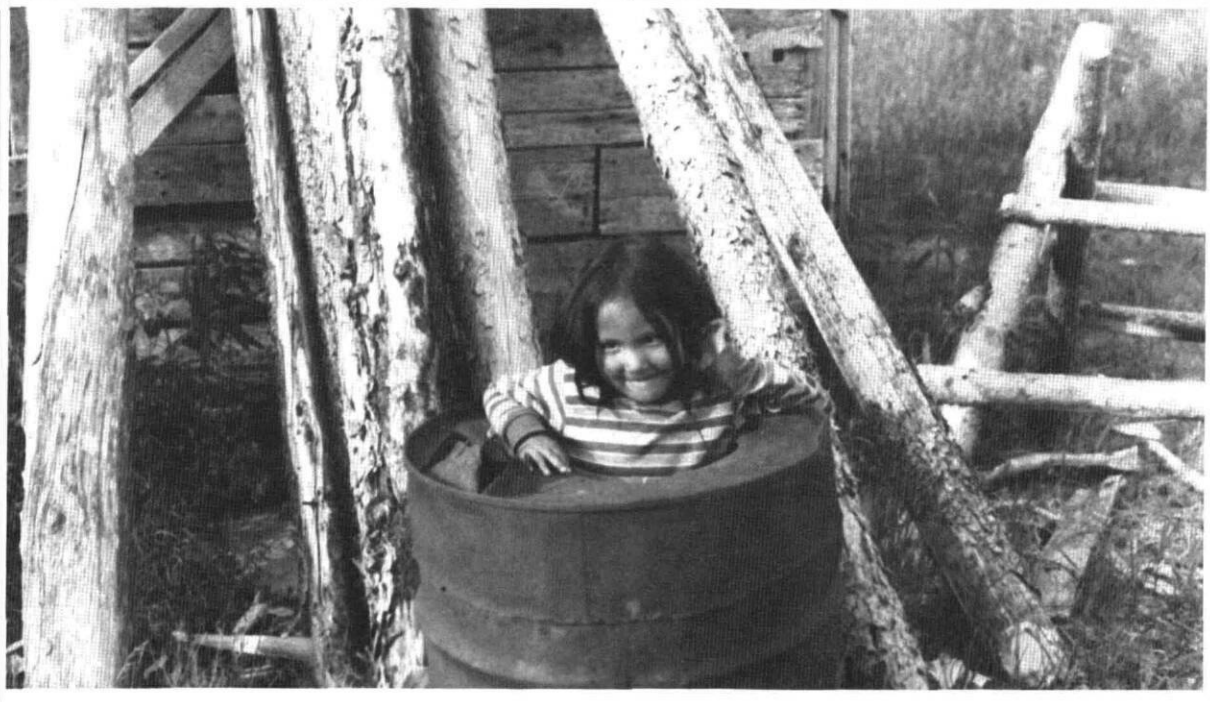
Morphine sulfate should be considered as an alternative to meperidine hydrochloride and alphaprodine hydrochloride for sedation of the child patient in dentistry. The results were satisfactory within defined parameters.

Dr. Schneider is a private practitioner in Jacksonville, Florida. Reprint requests should be sent to: Dr. Howard S. Schneider, 1871 University Boulevard South, Jacksonville, FL 32216.

1. King DL, Berlocher WC: Premedication in pedodontics attitudes and agents. Pediatr Dent 1:251-56, 1979.
2. Goodson JM: Conscious sedation: benefits and risks. J Am Dent Assoc 109:546-57, 1984.
3. American Academy of Pediatric Dentistry: Guidelines for the elective use of conscious sedation, deep sedation, and general anesthesia in pediatric patients. Pediatr Dent 7:334-37, 1985.
4. Chene GC: Hyoscine-morphine anaesthesia. Odontoblast 12: 81-84, 1906.
5. Bethel LP: Scopolamine-morphine method of inducing anesthesia. Dental Summary 26:219-21, 1906.

[c] Nisentil—Roche Laboratories: Nutley, NJ.

6. Waters RM: Pain relief for children. Am J Surg 39:470–75, 1938.
7. Smith RM: Anesthesia for Infants and Children, 4th ed. St. Louis; CV Mosby Co, 1980 p 100.
8. Baker AHL, Chivers EM: Opium as a sedative in children. Lancet 1:171–72, 1941.
9. Leigh MD, Belton MK: Pediatric Anesthesia. New York; MacMillan, 1949 pp 1–12.
10. Robson CH: Anesthesia in children. Am J Surg 34:468–73, 1936.
11. Jaffe JH, Martin WR: Opioid analgesics and antagonists, in Pharmacological Basis of Therapeutics, 6th ed, Goldman & Gilman, eds. New York; McMillan, 1980 pp 512–13.
12. Shane SM, Carrel R, Vandenberge J: Intravenous amnesia: an appraisal after seven years and 10,500 administrations. Anesth Prog 21:36–46, 1974.
13. Morgenstein RS: Premedications for children: an aid to management. Georgetown Dent J 40:9–12, 1976.
14. Blackburn C: A substitute for nitrous oxide-oxygen analgesia. Indian Health Service Newsletter 23:44–46, 1984.
15. Shane SM: Intravenous amnesia to: obliterate fear, anxiety and pain in ambulatory dental patients. Tic 26:13–16, 1967.
16. Kopel HM: Hydroxyzine as a preoperative sedative: a double-blind study with apprehensive children. Anesth Prog 18:127–35, 1971.
17. Goodson JM, Moore PA: Life-threatening reactions after pedodontic sedation: an assessment of narcotic, local anesthetic, and antiemetic drug interaction. J Am Dent Assoc 107:239–45, 1983.
18. Mueller W, Drummond J: Pulse oximetry monitoring of sedated pediatric dental patients. Anesth Prog 32:237–40, 1985.



David S. Richardson — Hide and Seek