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Panel Discussion

Troutman: In this final session I would like to get down to discussing some specific questions that have been brought out during this symposium, in hopes that we may come to a consensus, or an agreement to disagree, on specific issues discussed by individuals participating in this symposium.

The first question that I would like to propose to the panel has to do with the dosage levels of alphaprodine. There have been a number of different dosages recommended over the years. There have been a number of dosages recommended at this symposium. I would like to know how this group feels about these dosage levels and, particularly, about the dosages that are being recommended by Roche.

Drug Dosages

Aubuchon: I would start out by reviewing the average dosages that are being used for alphaprodine, which seem to be, on a mg/lb basis, about 0.2 to 0.4 mg/lb. That would extrapolate to about 0.44 to 0.88 mg/kg.

Approximately 0.8 mg/kg is about what the middle 50% of the profession is using. I suppose that is very close to what the individuals represented at this symposium are using. We have had responses in the 0.2 to about 0.8 mg/kg range. So I guess we're looking at a pretty good cross section of what's commonly being used.

Caudill: Dr. Troutman, could you make a comparison on dosage effectiveness with the doses that you used?

Troutman: In the efficacy study with our patients, the greatest effectiveness was in the range of 0.3 to .9 mg/kg, which is just a little more than 0.4 mg/lb. Once we passed 0.9 mg/kg, the effectiveness was decreased. I think this is a significant cut-off. The higher dose levels that we used, because the child was more of a problem or was considered to be a greater problem, might be inappropriate. Maybe those children really were not appropriate patients to be sedated and should have been treated utilizing general anesthesia.

Caudill: It also appears that at the 0.4 to 0.6 mg/kg range you're getting the same effectiveness as you are getting around 0.8 to 0.9 mg/kg. My suggestion would be to stay at the lower doses and prevent all those megadose problems that you might run into.

Troutman: We didn't really run into any "megadose" problems. The higher doses did not give us any more side effects or any more problems than the lower doses did.

Aubuchon: If I had to guess at what the new recommended dosages would do, I would say they would probably slightly decrease the efficacy of our alphaprodine technique. They would also probably greatly decrease the types of severe adverse reactions that have been reported. That is, severe adverse reactions wouldn't be completely eliminated, but they would certainly be decreased. I think we would be using a low-dose technique, which would be fairly safe and have an efficacy somewhere between 50% to 80%, depending on the kinds of children treated. In my mind, it's an acceptable dosage range.

Chen: The dosage recommendations that are in the package insert are biased by the number of cases submitted by Drs. Doan and Mack. In addition, we also looked very carefully at Dr. Aubuchon's data in terms of adverse reactions at a given dose per kilogram, and decided that the lower range not only would probably be of maximal benefit in terms of efficacy but also would minimize the possibility of adverse reactions; such reactions obviously would not be completely obliterated. That was why we ended up recommending the conservative dose. I think the general feeling here has been not to reinject if the drug is not effective. That being the case, if a patient does not respond to a dose, the dentist has to consider either having the child come back again and trying some other medication, or perhaps increasing the dose of alphaprodine or of one of the comedicants, or utilizing general anesthesia.

Dixon: The dose is certainly within the range that Drs. Mack, Doan, and Ryan have used. They are using about 0.45 mg/kg and that falls right in the middle of the 0.3 to 0.6 mg/kg that you're recommending.

Drs. Caudill, Aubuchon, and Dixon at the panel discussion.

I am not in that range and that's somewhat disturbing.

Doan: Dr. Troutman, regarding the higher dose levels, would they by any chance be associated with an older patient? What was the age range of the patients that you treated?

Troutman: The range was primarily between 1 and 7.5 years. There was one 11-year-old patient and one 10-year-old patient.

Chen: In our computer tabulation of Dr. Troutman's data, the majority of cases that were given higher doses were actually in the age range of 2.1 to 3.0 years.

Creedon: Since I represent the high side of the dose level, in that all of our patients were given 1.1 mg/kg (0.5 mg/lb); I think it's important for me to say that I'm not uncomfortable with what Roche is recommending because our dosage was arrived at purely arbitrarily. I think, if we cut back a little bit we will not see any appreciable difference.

Aubuchon: Dr. Doan, what was your dose of promethazine in your alphaprodine/promethazine technique?

Doan: We did not titrate it or use a per weight dose. We did that for a while and then we found that 25 mg orally was generally acceptable unless it was an older patient. In older patients we might give 50 mg instead. Promethazine is not given ahead of time, and I don't know whether this is psychological or whether it is actually doing any good. We just do not like the patients taking anything unless it's in the office where we are monitoring them. So we give them promethazine at the time that they are given the alphaprodine injection. This is not necessarily sound by all pharmacological reasoning. We did, however, notice a decrease in the amount of postoperative nausea, so we have continued to utilize that technique and it works.

Trapp: It works because the nausea tends to be associated with motion, and by the time the patient is mobile again the promethazine is working.

Doan: We have had people argue with us that we should not give promethazine because we gave it so late, but clinically speaking we did not find that to be the case. We found it to be effective at the time it was needed. It definitely has some antiemetic properties, after 30 minutes, that we feel are helping that patient who is getting up and moving around. A lot of nausea episodes are going to be post-treatment, when a patient starts to move around.

Trapp: If I could just comment on that. The only pharmacologic criticism that I see would be that you are not benefiting from the sedation that is provided by the promethazine until toward the end of the appointment. If you were intentionally trying to supplement the sedation, it should have been given earlier. In terms of the nausea, I think that you are utilizing the drug properly.

Doan: We did not give it as a comedication for sedation purposes. We gave it strictly for antiemetic purposes. We felt the alphaprodine alone gave us the sedation we needed, but we didn't like the postoperative nausea we were getting. Preventing the nausea was our objective. Now that you have pointed it out, we probably might benefit by giving the promethazine a bit earlier.

Aubuchon: I think another benefit to your technique is in terms of risks involved with all sedations in general. The only severe problems in our study in the non-narcotic oral sedations were when the parents inadvertently gave 2 or 3 times the amount, or where there was a mistaken formulation or something of this nature. These kinds of mistakes are more apt to occur if you are relying on the parents to administer the drug.

Doan: I agree with your comment, Dr. Aubuchon. If you have the parents give the sedative to the child, he may spit out the first two pills because they taste terrible. The parents might then give him another pill. You really don't know how much the child absorbed. I might add one other point that we were very adamant about in all our years of using alphaprodine. We *never* gave repeat injections during a procedure. We estalished a dose level that we felt was effective in our hands. If the sedation technique did not work, we felt it was not the drug's fault and the patient did not need another dose of it. We just refused to reinject, even in those patients where we had decided to cut the initial dose to half of what it would normally be. If the doctor made an incorrect decision, we would reschedule another appointment for the patient rather than reinject. The patient would be given the full dose at a second visit. When you are dealing with different peaks in sedation, a second dose just complicates the matter considerably, in our opinion. At no point was a patient ever reinjected.

Aubuchon: That is one of the things that was very interesting in our study. It was very common for those people that ran into severe problems to have had repeated doses. In reading some of the comments in the survey, I got the feeling that maybe the child did become sedated early on in the treatment. Maybe the dentist opened up the whole mouth or a very large area and, all of a sudden, the child started being aroused. The dentist gave the patient another injection with another dosage of narcotic. The child then became oversedated.

Troutman: There is another phenomenon that was alluded to earlier. The drug will not affect all children within 10 minutes. In some there is a delayed response. In some I have seen delays up to 40 minutes before you get the full sedative response. If one were to inject a second dose before that time, the dose is doubled, and when the drug effects peak after the second dose, there is trouble.

Dixon: My feeling is that I don't have as much concern with reinjecting if you use only alphaprodine. However, when you have another comedicant that may, after a period of time, influence the peak effect of alphaprodine, then I do have a concern with reinjection. Because I do use a comedicant, I have just chosen not to reinject.

Mack: Dr. Doan, did you say that you don't like to use alphaprodine for children less than 2 years old or that you don't use it for 2-year-olds?

Doan: No, I definitely feel that there is an indication for alphaprodine in patients under two years of age, especially in those patients where you only have a few restorations to do and you can't justify using a general anesthetic. I definitely feel that it is indicated, and I've used it, without question, on kids under 24 months of age. I was referring before to the emergency patient that is 12-16 months of age and is crying the whole time; in this case, I give sedation and want to be through quickly. I am stimulating him in addition to his being frightened. It's just not going to be a successful case in terms of sedation. Yet I feel it still has benefited the patient and helped the doctor get through the case. I don't like to send these patients home immediately, however.

Aubuchon: I think that's a very valid concern because I think we extrapolated the age and weight factors back to those younger ages. It appeared, from the work that we've been doing, that the younger the child's age or the smaller the child, the more susceptible they were to having problems.

Doan: Not everyone sedates a 12-month-old child before doing dental treatment. You need to protect the patient in every way that you can and utilize whatever experience you've had in the past.

Chen: Dr. Aubuchon, you mentioned that by using a dosage less than 0.66 mg/kg you might be able to decrease adverse reactions by 50%. That's fine, but what about the other 50%?

Aubuchon: If you just look at the dosages of the major sedatives in the case reports, they would divide roughly into two categories. First would be a high-dose category where everyone would say, yes, I know why that child had the problem. But then there would also be a very-low-dose category where there would also be a problem; I don't think that we have any kind of explanation for those cases. I think the dosages described in the new package insert will eliminate the majority of the high-dose problems, which also tended to be more severe, but it's not going to eliminate all of the problems.

Trapp: In regard to the data that you presented on

convulsions, did you conclude that there was an increased incidence of convulsions in sedated patients, more with one drug than another?

Aubuchon: Yes, with meperdine: compared to alphaprodine, meperdine had more convulsive complications.

Chen: That's interesting in that there was a publication last year on an increased incidence of seizures with meperdine. This came from the Memorial-Sloan Kettering Cancer Center, Pain Clinic. The study looked at meperdine versus other drugs for analgesia in cancer patients. What they found was that there is an increased incidence of seizure problems with patients who are taking meperdine. The seizures seem to correlate with the blood levels of normeperdine, the chief metabolite of meperdine. This study led to the marked reduction in the use of meperdine in treating cancer patients in that clinic.

Trapp: Was there an attempt to correlate convulsions with the dosage of local anesthetic on a per kilogram basis?

Aubuchon: We looked at the rate of convulsion as a function of the major narcotic being used. Then we looked at the rate of convulsions as a function of the number of local anesthetic carpules used and the severe adverse reactions related to the number of carpules of local anesthetic. There appeared to be an increased incidence of severe adverse reactions associated with increased amounts of local anesthetic. There are several studies in animals that have looked at the drug interactions between local anesthetics and narcotics to see whether effects are potentiated or additive. This has not been done for alphaprodine or meperdine. There is a definite interaction between local anesthetics and narcotics. What the interaction is no one knows, but there is a phenomenon there, and it is something we have to be aware of in sedating children with narcotics while using local anesthetics.

Trapp: Among the potentiating or additive drugs presented at this symposium that are being used in addition to alphaprodine, promethazine seems to be the most potent sedative drug. I am really not adequately informed on the pharmacokinetics and the activity of the various aspects of dimenhydrinate (Dramamine®). I know it is transformed or metabolized into diphenhydramine HCl, but I don't know whether dimenhydrinate is active or whether it's a metabolite that's acting. If in fact it's diphenhydramine, then it is less potent that promethazine as a sedative, in my experience. It may also be less potent than hydroxazine. So I suspect that's why Dr. Dixon is using somewhat larger doses. He really has less of a supplemental sedative.

Dixon: The initial contact that I had with dimenhydrinate was when I went to the local pharmacist and asked him to give me an antihistamine that was the lowest potentiator of a narcotic, but that also had antiemetic action. One of the other requirements was that it would be in a reusable vial. Dimenhydrinate was his response and he said that it has a very low potentiation effect for narcotics. I then experimented with it and have been using it ever since.

Monitoring

Troutman: We now move on to another question that must be answered by this symposium and that is the monitoring of patients that are sedated in this or any manner. I would like to ask this panel what types of monitoring you feel are appropriate for pediatric sedation techniques, and how many dentists in the community, broadly speaking, do you think now utilize appropriate monitoring techniques?

Dixon: If I could start off, I don't use more than respiratory rate monitoring with a stethoscope. I certainly would concur with the use of a precordial stethoscope over the throat area. That sounds like an inexpensive instrument that can be utilized very easily to gain a tremendous amount of information during the procedure.

Chen: It is my general impression that most dentists do not use equipment for continuous monitoring, but rather do periodic monitoring once every half hour, maybe at the beginning and the end of the procedure, and so on. The only way that they check for any problems with vital signs is by noticing the chest excursions, but that is hard to do with a patient in a Pedi-Wrap.® The state-of-the-art is such that more continuous monitoring should be done.

Troutman: We feel very comfortable using a precordial stethoscope to hear breath sounds and pulse rate. It has given our residents, and the people with whom I work, and me a lot more confidence in our knowledge of the status of that patient.

Trapp: I think Dr. Chen's impression is accurate and we should discuss it, but I think the same holds true not just for pediatric dentistry but for all of dentistry and medicine. If you note, for example, when you go into a radiology department and you see sedation that goes on there, medication is frequently given with no monitoring other than visual signs, as we use

in pediatric dentistry. It's certainly not ideal.

Chen: Although you can't account for idiosyncratic allergic reactions, you could certainly reduce morbidity or mortality by continuous monitoring and immediate intervention.

Trapp: The earlier the intervention, the more likely its success because you have more time to treat the problem.

Mack: In terms of monitoring, there is no question that the chair-side dental assistant can play a role. This certainly doesn't preclude or eliminate the responsibility of the dentist. The very brightest assistants can be very easily trained to determine arousability, status, color, and oxygen exchange. This is especially valuable if you are attending to more than one child at a time. It is critical that there be someone monitoring at the chair at all times.

Troutman: With our residents, once they try a precordial stethoscope they feel uncomfortable *not* using it. I think that speaks for their concern for the safety of the patient as well as for themselves.

I must also say, in all fairness, that in a university health center I have also seen patients receiving injectables and not being closely monitored.

Trapp: Dr. Creedon, I'd like to make a few comments on the Dynamap.® This is the first generation of a new machine and it's rather impressive in certain situations. Plastic surgeons, for example, find it particularly useful. Pediatric dentists and oral surgeons, I think, are using this to a greater extent nationwide. There are a couple of things that I don't like about the Dynamap.® One is that on this model you don't have a manual ability to inflate a cuff. There are now second generation models, from other companies, that do have manual overrides. All these machines, however, are excellent from the point of view of the operator who is doing the sedation. You always have information at your fingertips.

There is another point that I have not stressed before. If you're going to ask an assistant to take the blood pressure — which is frequently the case during these procedures — and you're using the hand piece, she will not be able to hear that stethoscope if she's using conventional techniques. What I have done in my own practice is to incorporate a device which electronically amplifies the output of a blood pressure cuff so that I can clearly hear the systolic and diastolic sounds. There are many devices available that have audiometric additions coupled with a blood pressure measuring device. Infrasone,® I'm convinced, is a rather good device; it is expensive, however, as is the Dynamap.® We talk a lot about blood pressures, but we don't talk a lot about monitoring after we mention it. It is often very difficult to accurately monitor blood pressure during the operative procedure.

Creedon: Using this electronic device in conjunction with meperdine and chloral hydrate, we came to the realization and the appreciation of how close we are to general anesthesia.

Aubuchon: The traditional method of monitoring is probably one in which we look for late signs of problems, which in itself is a problem. We are looking for depressed respirations, cyanosis of the lips, etc. This has been the monitoring state-of-the-art in sedated children, and it is probably incorrect. I was very impressed with Dr. Creedon's procedure using an electronic monitoring device, but I'm not sure how that would work out in a private practice because of the expense. I think in busy practices you may sometimes have three or four children sedated at the same time. I'm not sure that this could justify the expense of such sophisticated equipment. That would be the only drawback. Otherwise it's great, it's top-of-the-line monitoring.

Chen: Would you say, perhaps as a consensus of this group, that precordial stethoscope monitoring, at the bare minimum, should be done and perhaps something more sophisticated if possible?

Mack: I don't think it's routinely necessary. I think it would be ideal. In our practice, we've recorded almost four thousand successful cases that we've treated and there have been several additional thousands that we didn't record. I think that by using our technique of close visual monitoring — watching the arousability of the child, observing the eye reflexes, blowing on the eyelids to see if they squint, etc. — you can make clinical judgments. We have not found, in our practice, the need to go beyond close visual monitoring.

Troutman: My concern about that is that when you do run into a problem it's in a late stage. You don't have a mechanism whereby you can pick up real difficulties in the airway at an early stage of development. I don't know how other people feel about that, but I feel that the precordial stethoscope enables you to do what visual monitoring does not. At a time when your visual attention really is more attuned to the technical procedure that you are trying to accomplish, you cannot be paying attention to monitoring the patient accurately.

Chen: That's a concern; periodic monitoring is fine, but the catastrophic event will probably always happen in between those periodic monitorings. Also, how periodic is that monitoring? Some people have done it every 5 minutes, others every 15 minutes. Some people do it once at the beginning and once at the end, with an occasional glance in between. It seems to me that this is one area where the practitioner could really minimize the chances of potential problems by utilizing something simple, such as a precordial stethoscope. Of course the Dynamap® would be wonderful. On the other hand, the precordial stethoscope is not a big investment.

Creedon: I skipped over one area of my presentation rather quickly, but I feel that there are less expensive means of getting vital signs in an effective and efficient way. We need vital signs and, though we as dentists are used to subjective evaluation, we should offer a recommendation. I certainly feel everybody needs to subjectively evaluate the patient, but there's something a lot more accurate in having definitive quantitative values of what's going on. I think heart rate and blood pressure monitoring is needed. How often it is needed can be discussed I think.

Trapp: Some people erroneously think of frequent blood pressure checks as continuous monitoring. A precordial stethoscope *is* continuous. For a routine case, continuous monitoring is desirable. The precordial stethoscope fits the need to have input of information constantly. I think that intermittent monitoring of the vital signs is also a good idea. Let me just point out that, for example, if you don't take baseline vital signs before the drugs are administered, how are you going to know that the patient is in bad or good condition later in the procedure? I think that some form of continuous monitoring is necessary and, in the case of the precordial stethoscope, that it can be inexpensive. I would recommend it. I also recommend intermittent monitoring of vital signs as well.

We have been shown that blood levels of alphaprodine certainly peak at 5 to 10 minutes. Clinically, I think we generally agree that the peak of clinical response with submucosal alphaprodine is around 10 minutes, plus or minus 10 minutes. During that period of time, that first 10 to 20 minutes, I think we are obliged to take vital signs every 5 minutes or more frequently. After the first 30 minutes or so, it becomes less necessary, because that is when the patient is starting to return to normal. A total return to normality takes a long time, but we can reduce our frequency of vital signs monitoring to 15 minutes.

Dixon: We have to be careful about making a strong time-related statement like that because comedicants may influence clinical effects. Some comedicants may have their maximum clinical effects after 40-50 minutes. Thus, one needs to monitor intermittently throughout the procedure. I think that it certainly is important that the higher the dosage levels used, the more incumbent it is upon the practitioner to consider continuous monitoring.

Trapp: Let me just say one thing about when to take a blood pressure reading. The baseline blood pressure does not have to be taken on the day of surgery, by any means. In fact, I agree that in a child who is apprehensive, the vital signs are affected in some way and the best thing would be an earlier blood pressure recording: I have no objection to that. You do, however, need a baseline on which to judge changes down the line.

Troutman: Dr. Trapp, would you rely on a blood pressure that you obtained from a physician, from the child's pediatrician, one that might have been taken within a reasonable period of time?

Trapp: I would discourage that because you don't know how accurate your own equipment is relative to the equipment that was used to take the blood pressure in another setting.

Dixon: There are certain ranges that practitioners should be aware of if they are going to monitor either the rate of respiration or the pulse rate on a child that is sedated.

Trapp: Children's vital signs differ considerably from what we know as normal for adults. I'm talking, for example, about a 5-year-old who has a heart rate of roughly 100 beats per minute and a blood pressure roughly 100 systolic over 60 diastolic. Younger patients have lower baseline blood pressures and a higher heart rate.

Mack: Another point concerns those general practitioners or specialists who have not had the opportunity to have at least some anesthetic training, whether through continuing education courses or by other means of gathering this information. Such people should certainly avail themselves of every opportunity to become more knowledgeable in this area. We are not talking about courses which include just local anesthetic use or nitrous oxide/oxygen use: it is both of these plus the use of narcotics and other sedatives.

Troutman: It is safe to say then that we agree that

continuous monitoring of respiration and periodic monitoring of vital signs are necessary during treatment utilizing a sedative technique, and that we feel that there are many acceptable techniques for accomplishing this, but that a precordial stethoscope is a very helpful basic tool.

Narcotic Reversal

Troutman: The next question has to do with the use of naloxone HCl as a reversal agent and its indication for use with alphaprodine. This should be discussed, particularly in light of the package insert recommendations as to whether the statement made in reference to the routine use of naloxone is advisable. I personally haven't heard any indication on the part of the participants here, that naloxone is not a good agent or not the agent to use in reversing alphaprodine's narcotic effects. I also haven't heard anything significant that tells me there is any contraindication to using naloxone on a relatively routine basis to reverse children that are not stable at the completion of treatment. Is that correct?

Creedon: Roche refers to "routine" naloxone reversal in the package insert. We stopped routine reversal some time ago because we felt that we really didn't need to do it.

Doan: Something else to consider is that if naloxone has an effectiveness of only 30 minutes, and if the narcotic drug reacts longer than that, are you not giving the patient and the patient's parent a false sense of security in sending the child home appearing fine? Will there be an adverse reaction at home?

Chen: Not in the case of alphaprodine. I think that with meperidine there would be a liability. Alphaprodine's duration of action is usually about 45 to 90 minutes, depending on the dosage used. After administering the drug at the beginning of your treatment, the patient is being aroused by the end of the procedure. The effects of naloxone would last for about 30 minutes, sometimes even longer than that. Thus, you would be catching the tail end of the sedative effect, and in the recommended dosage range you would not encounter a problem of renarcotization. The package insert does not say that you must reverse all patients with naloxone. It is felt it should be done, but it is not necessarily a requirement.

Aubuchon: One of the things that Dr. Chen focused on is postoperative management of these patients after the treatment procedure has been completed. We need to concern ourselves with that. There have been problems that have occurred after a child has gotten home and relaxed, whereupon the narcotic has depressed him further. There might be other ways of maintaining the stimulus of the child without giving a reversal agent. It might be a good idea to encourage the dentist not to let the child go home and sleep. If he does allow him to go home, to keep the child stimulated, keep him awake.

Chen: Those are the recommendations one would hope to communicate in postgraduate training programs and also in educational materials for the pediatric dentist, or the dentist using the drug.

Doan: In our practice, we encourage the parents to take the patient home and advise them to allow him to sleep, on his stomach, if he is sleepy and to watch out for vomiting. We tell them to let the child sleep for no more than 45 minutes and then to wake him up, so that the child maintains a normal schedule as far as sleeping is concerned. We call the parents postoperatively and ask if the patient did sleep.

Creedon: We all have had an awful lot of experience with sedating children. They all sleep when they go home, many for long periods of time. We've discharged them to both reliable and less reliable mothers and fathers. We at the Cincinnati Children's Hospital have never had a single problem occur. Maybe we're working too hard in this instance looking for problems.

Dixon: If I were certain that there was going to be a rebound potential for respiratory depression, I would be concerned about the routine reversal with naloxone. I agree with Dr. Chen, however, and I don't think that's the case. Therefore, I'm not worried about it.

Doan: However, any time you can avoid using a drug you're better off. In my experience if one were to use naloxone on every patient, in 90% of cases it would mean an increased utilization of the drug when it was not needed. I can see the recommendation for it, however. It's certainly going to do no harm and it could possibly help.

Doan: Dr. Dixon, in your study of 500 cases, how many times have you reversed patients or found a need to?

Dixon: About three times. One was because of actual cyanosis, but the other two or three just seemed to be a little slow in recovering and, after oxygenation for a period of time, I felt more comfortable reversing them with naloxone. I don't do it routinely but I do utilize it, usually on the basis of the patient's

response and probably more frequently when I may have used a little heavier dose of alphaprodine.

Aubuchon: Personally, I find it hard to get terribly excited about this one particular issue. I agree with Dr. Creedon's comment. In thinking about it, I don't have any trouble with that recommendation in the insert, though I don't think it's terribly necessary. But I do think it probably would decrease some of the adverse reactions, especially for those practitioners that use the sedation technique — whereby they dismiss the child very soon after the procedure is finished, allowing the child to do whatever he may. I think in those instances reversal accomplished with naloxone would probably be better than doing nothing at all.

On the other hand, it's fine if the practitioner either retains the patient until most of the observable effects are gone, or takes precautions not to have the overly sedated child go home and go to sleep. I think that is equally effective in being cautious and responsible with our sedation techniques.

Sedation of Disabled Patients

Troutman: I have another question that has to do with whether mentally retarded and handicapped patients, such as children with Down's Syndrome, present more of a problem with alphaprodine management. Do you feel you see more complications with this group of patients than you do with "nonmentally compromised" children?

Doan: I personally have not noticed any great difference. Of course if a Down's patient has a cardiac problem, you are dealing with a medically compromised patient. In the basic category of mentally retarded patients, I have found alphaprodine and promethazine sedation techniques to produce sedation as effective as in the normal healthy patient.

The one area that I'm very concerned about is the cerebral palsied or other patient who has compromised respiratory control. I definitely think there are contraindications to the use of any respiratory depressant in those patients.

Trapp: How about the mentally retarded, the severely retarded patients with constant salivary secretions?

Doan: From my standpoint, we are talking about a category of patients that needs general anesthesia rather than in-office conscious sedation. They don't necessarily have good control of a patent airway to start with, so why compromise that?

Creedon: I would agree with all that's been said except that, as I pointed out earlier, we have discovered that these children sometimes require higher doses of sedative drugs because of differences in their metabolism. I don't think the complication rate is any different. I think that efficacy might be compromised with the recommended doses and that, instead, you might elect to use general anesthesia. I do think we have to recognize that these children frequently are different physiologically.

Troutman: But you don't feel that there is any significant increase in side effects or problems with a child such as that?

Creedon: No.

Aubuchon: When we looked at the case reports and evaluated adverse reactions, one of the things we looked at was the systemic complications that some of these children had. By and large the children were healthy, but there were a few cases in which the patient was physically compromised and where the disability did seem to help precipitate the problem. This has more to do with mechanical kinds of obstruction of the airway, such as macroglossia or micrognathia.

In talking with respiratory physiologists, there seem to be certain special patients, with different systemic problems, that do have clinically flaccid musculature in the pharyngeal area. Two cases that come immediately to mind were micrognathic children. One child received a very low dose of a moderate non-narcotic sedative and had severe respiratory depression. A second child received a narcotic sedative in a very normal dose range and had a pretty severe adverse reaction.

Along the same line, there does seem to be a high-risk category in children that are susceptible to apneic episodes. I'm thinking of a new field that is emerging — sleep apnea. There are certain types of children that may be designated as high-risk patients. I think more research needs to be done in that area. Over the next few years, we may find that a child's respiratory physiology is not as simple as we've thought. In the meantime, we ought to be on the lookout for children with compromised respiratory problems — micrognathia, cerebral palsy, children with compromised airways, children with poor muscular tone, systemic diseases that might cause that, etc.

Documentation

Troutman: The last question I have is an important one. It has to do with the kinds of records that would be indicated when one is undertaking a procedure of this kind. Dr. Trapp, would you like to begin the comments on that?

Trapp: If you are going to take on some therapeutic endeavor, there isn't a lawyer in the country that won't tell you that you should document what you do. It's true in all aspects of dentistry and this is no exception. If you are going to administer a drug, the very minimum that you must document is what you administer, how you administer it, and whatever monitoring you do. You should especially document the condition of the patient when he is released, including some criteria on which you're basing your release. If you are in a court of law because of a poor outcome, which may have been completely unrelated to what you did, and you know what drugs you gave when and the patient's status when released — but you didn't write it down — you are in trouble!

I would encourage anybody who has an individual spectrum of techniques to create a form which is appropriate for your particular techniques and make it easy. Check off things. It can be very fast and the assistant can record, date, and time it. I feel very strongly about that. Dr. Troutman and I have developed such a form and we will make it available to you. (Appendix I).

If a patient has a poor outcome an hour later, when you've left the office and the assistant is left to respond, what information can she give out? If you have a form and a complete record, she can look up and say he received "X" milligrams of type "X" narcotic and "Y" sedative at "X" o'clock. This information may greatly expediate emergency care for the patient.

Troutman: Some people do keep records in strange ways. I know some dentists who tend to write things on paper towels and forget to put them in the record from time to time, then have to dig them out of the trash to ascertain what the dosages and the administration times were.

Aubuchon: People in our survey volunteered the fact that they did not have a narcotic ledger that they used in administering narcotic drugs. The FDA requires a separate narcotic ledger *other* than your patient chart record.

Conclusion

Troutman: We have run out of time and, for final comments, I want to say that I think that out of this symposium should come a recommendation for continuing education programs in this specific area of pediatric dental practice.

We, the participants in this symposium, agree that further education in this area is important and that the American Academy of Pedodontics should be involved in developing such programs.

Aubuchon: I think we should also recommend additional research, such as comparative drug studies, pharmacokinetics, etc. We need some basic science research and we need some good clinical research comparing the various drugs and their applications in comedication. What is (are) the best comedication technique(s)? Should we use nitrous oxide/oxygen in conjunction with other sedative drugs? There are many questions which need answers.

Troutman: Finally, I think that an off-shoot of this symposium should be the Academy's ongoing involvement in the further development of guidelines for the use of sedative techniques in the clinical practice of pedodontics.