PROVIDING DENTAL CARE TO PERSONS WITH SEVERE DISABILITIES UNDER GENERAL ANESTHESIA

Purpose of this Module

The information contained in this module provides guidance to the general dentist who will be providing dental care under general anesthesia. The module addresses patient selection, general case management, modifications of treatment and relationships with other professionals in the operating room setting. This module does not cover issues involved with the administration of the anesthesia itself.

Learning Objectives

After reviewing this material, the participant will be able to:

1. Describe a typical operating room arrangement suitable for providing dental services.

2. List two indications for use of general anesthesia to provide dental care.

3. List five issues that should be addressed in preoperative orders and two issues that should be addressed in postoperative orders.

4. List the procedures, in sequence, that the dentist will perform when providing dental treatment to a patient under general anesthesia.

5. Discuss six modifications of dental treatment commonly encountered in a general anesthesia case.

PROVIDING DENTAL CARE TO PERSONS WITH SEVERE DISABILITIES UNDER GENERAL ANESTHESIA

INTRODUCTION

The information presented in this module reviews the procedures, special concerns and modifications of treatment for persons with developmental disabilities and those with mental illness receiving dental treatment under general anesthesia. The details of general anesthesia that do not impact the dentist are excluded.

Most institutional facilities do not have general anesthesia available except on a referral basis, usually to an oral surgeon for extractions or other surgery. Occasionally referral to a dental school or similar facility is possible, but these resources are often limited to the treatment of children. Arrangements with local hospitals for general anesthesia can often be made; however, the institutional dentist may feel unprepared to provide treatment in this setting. One purpose of this module is to demystify the dentist's role in these cases.

The operating room, often perceived as mysterious, is simply a room where the general dentist will provide dental services for an unconscious patient. From the dental viewpoint, nothing should be simpler or easier for the experienced institutional dentist. The hospital environment, however, is often neither simple nor easy, especially for the dentist with little clinical experience. The environment is often intimidating and the administrative requirements are often complicated and burdensome. The prudent dentist will almost always assist a more experienced dentist until the hospital environment ceases to be intimidating and the details of the administrative requirements mastered. General anesthesia cases should not be attempted until clinical skills (e.g. speed/dexterity) are adequate and the concepts of treatment planning in this environment are understood.

In most instances, the dentist will be working with an anesthesiologist who has control and responsibility for general anesthesia procedures for the patient. If the dentist is limited to utilizing a nurse anesthetist, the responsibility for the patient's general welfare and safety is shared. Many general dentists would be comfortable working with an anesthesiologist, but not in sharing responsibility with an anesthetist.

The anesthesiologist usually has the responsibility of confirming informed consent for general anesthesia and communicating to the nursing staff necessary preoperative and postoperative orders related to the anesthesia. The dentist is responsible for any postoperative orders relating to the dental treatment provided and may share with the anesthesiologist (or occasionally with the admitting physician) preoperative orders, particularly those affected by dental treatment such as required antibiotic prophylaxis, bleeding tests and other tests. When the endotracheal tube has been removed and the patient is stable, care usually will be turned over by the anesthesiologist to the nursing staff. Discharge of the patient will usually be the responsibility of the staff physician or the dentist (if he/she has admitting and discharge privileges). Each facility and each situation will vary regarding the assignment of responsibility, yet it is imperative that each team member clearly understands his/her responsibility prior to any case scheduled.

A more important issue is the appointment of a dental coordinator for all dental general anesthesia cases. This person is usually the dentist, but certain details can be delegated to a staff hygienist or assistant. The dental coordinator is usually responsible for confirming operating room (OR) availability, confirming that consent has been obtained (usually by the social worker or other unit staff), confirming that the necessary preoperative orders (often written by the dentist) have been delivered to those responsible and that all support staff (particularly postoperative nursing staff) are aware of the schedule. This may sound more complicated than it really is. The most important elements are meticulous attention to detail and clear communication. A written checklist may be helpful.

Postoperative and occasionally preoperative behavior management usually requires the addition of direct care staff to augment the nursing staff. Behavior problems are a major concern of community hospital staff and are often the major barrier to obtaining anesthesia services in the community.

OPERATING ROOM (OR) EQUIPMENT/PROTOCOL

There should be one dental assistant for the dentist in addition to a circulating assistant (usually a dental assistant or hygienist), who will assist this dental team, particularly in arranging for various equipment and supply needs. The equipment is that usually found in a dental operatory and includes an x-ray machine. Unfortunately, in a large OR the dental x-ray machine is often portable and cumbersome to move. Similarly, in most OR settings the lights available are surgical, not dental lights, and are likewise cumbersome to use and very hot. All other equipment, including high volume suction, ultrasonic scalers, and electrosurgical apparatus should be readily available. All necessary instruments should be available and redundant (at least two of everything). All potentially necessary supplies should be readily available including stainless steel crowns and endodontic kits. All equipment should be tested prior to any OR case. Most anesthesiologists do not use anesthetic agents for dental cases which would require spark-proof equipment.

Operating room protocol will vary depending upon the facility. If the OR is reserved for dental cases only, the infection control procedures are no different from any other dental operatory. If general surgery is also performed in the OR, the level of aseptic technique is considerably different, requiring more rigorous infection control and postoperative disinfectant procedures. The description of general anesthesia arrangements at three different MR/DD facilities is presented in Appendix A.

PATIENT SELECTION

The decision to provide treatment using general anesthesia depends upon numerous variables. One issue that should not be a determinant is the lack of skill of the institutional dental staff to provide needed services utilizing dental restraints and conscious sedation. It has been previously stated that most MR/DD institutions have very few children residents and nearly all of these individuals can be provided services utilizing sedation and/or restraints. Therefore, almost all residents (and outpatients, if applicable) referred for general anesthesia will be adults who will present a wide array of treatment needs. Most of these patients fall into four categories: (a) patients who are totally resistant to any treatment without general anesthesia, including prophylaxis; (b) patients who can only be provided routine prophylaxis and minor restorative care under local anesthesia with sedation/restraints; (c) patients who can receive routine dental care under normal circumstances (with or without sedation/restraints) but require general anesthesia for more difficult procedures (e.g. extraction of impacted teeth, difficult endodontic procedures, or preparations/impressions for a fixed partial denture); and, (d) patients who can receive routine dental care under normal circumstances (with or without sedation/restraints) but due to a large volume of unmet dental needs can best be treated under general anesthesia. Each of these categories will impact the expected follow-up of the patient, the expected length of case (time) and the expected modifications of treatment planning.

PREOPERATIVE/POSTOPERATIVE ORDERS

(Also see Appendix B)

Preoperative Orders

There are very few orders needed for the use of general anesthesia. These usually include:

- **A pre-general anesthetic physical by a physician to assess cardiovascular and respiratory function.** The physical status of an MR/DD institutional resident is usually well known by the unit physician and the physical evaluation primarily relates to detecting upper respiratory tract infections or other acute illnesses. For some outpatients, however, a thorough physical evaluation is difficult and sometimes impossible to obtain. Vigorous and successful resistance to a physical exam without negative symptoms usually indicates adequate cardiovascular and respiratory health. It is ultimately the responsibility of the assigned physician to verify the physical condition of the patient.

- **Nothing by mouth (NPO) for 6-8 hours prior to general anesthesia.** The anesthesiologist requires an empty stomach to prevent aspiration problems in relation to induction and to decrease postoperative nausea/vomiting. This requirement may present two complications; first for routine medications (especially anticonvulsants) and secondly for any prophylactic medications (especially SBE prophylaxis). The first problem can be solved by postponing the routine medications until after the procedure, by giving the

medications intramuscularly (IM), by giving the medications by mouth with a small sip of water (e.g. less than 2 oz) or by giving the medications in liquid form. The unit physician should be consulted not only concerning the need for anticonvulsant medications but also the need for other medications such as those for behavior control and the need for intraoperative insulin for diabetics. The maintenance of adequate anticonvulsant blood levels is of particular importance for the patient with poorly controlled seizure activity. Similarly, routine SBE prophylaxis (e.g., 1993 regimen) can either be given IM prior to the procedure or immediately after anesthesia induction, or oral medication can be given with a sip of water or in liquid form 1-3 hours prior to the anesthesia. For those patients who are allergic to Amoxicillin/Penicillin, IM Erythromycin is not available and a Cephalosporin is usually selected. If Erythromycin is selected the liquid form is clearly preferable. If a patient is highly allergic to Amoxicillin/Penicillin (i.e. ruling out Cephalosporins with their 10% crossover sensitivity) and is also intolerant of Erythromycin, the selection of IV Vancomycin after anesthesia induction may be the only choice. The unit physician and the anesthesiologist should be consulted.

- **The anesthesiologist will usually require preoperative or intraoperative Atropine or Robinul to reduce salivation and bradycardia effects and vasovagal response to Halothane.** For an adult over 70 pounds a dose of 0.4mg Atropine IM 45 minutes prior to the procedure is indicated. Many anesthesiologists will also order Zantac (300 mg PO, h.s.) to reduce gastric activity and to prevent reflux of gastric contents. Occasionally, the anesthesiologist may need to employ sedation (e.g., Ketamine) to transport the patient to the OR area.

Several laboratory tests are required before dental procedures are performed under general anesthesia. These usually include but are not limited to:

- **Laboratory tests, usually CBC and urinalysis.** For an institutional resident these tests may be redundant or not needed due to the known medical status of the patient. For some outpatients these tests may be impossible to obtain (especially any blood tests) and may have to be postponed until the patient is under general anesthesia.

- **Bleeding profile, especially a bleeding time.** A bleeding time is especially important if the patient is taking medications that may affect clotting (e.g. Depakane) and extensive extractions or surgery are anticipated. However, if a patient is uncooperative enough to need general anesthesia, a bleeding time may be impossible to obtain and may be obtained only after anesthesia induction. A close working arrangement with laboratory personnel is essential.

Postoperative Orders

There are few postoperative orders that relate to the general anesthesia except to (a) monitor the vital signs every 15 minutes until stable and (b) to keep the patient on a clear liquid diet until full recovery from anesthesia is evident and there is no nausea/vomiting noted. The postoperative orders relating to dental care involve analgesics, antibiotics and antiemetics. When postoperative analgesics are prescribed they are usually administered IM to prevent vomiting induced by oral medications, with the first choice usually being Meperidine (Demerol) IM in doses of 25-100 mg every 4-6 hours as needed. Some clinicians prefer to include Phenergan or Vistaril with Meperidine to reduce the dose of Meperidine and for antiemetic effects. If the patient is intolerant (or allergic) to Meperidine, an alternate parenteral analgesic appropriate for moderate to severe pain is needed (e.g., Toradal, Talwin, Fentanyl). Since these drugs are rarely used in dentistry, general dentists must familiarize themselves with available parenteral analgesics. The prescription of analgesics is usually needed only if surgical procedures have been performed. Occasionally the patient will not require or tolerate parenteral medications and therefore the usual analgesics can be given by mouth (e.g. Tylenol #3). Often an initial parenteral analgesic dose followed by oral analgesics is all that is required. Usually the dentist will write orders for both. (i.e., either/or) leaving the route and drug choice to the nursing staff.

The need for antibiotics to prevent infection can usually be postponed until final recovery (or the following day). For difficult/combative patients a loading dose given IM during the procedure may be indicated (e.g. Bicillin CR). All dentists are familiar with the use of oral antibiotics to prevent postoperative infection.

Vomiting following general anesthesia is common, especially after surgical procedures with swallowing of blood, and is usually not a concern. If vomiting continues, however, and becomes a serious issue, a parenteral (or rectal) antiemetic is required. The drugs of

choice (in order of effectiveness and also in order of CNS depressant action) are usually Phenergan, Tigan, and Compazine. A typical antiemetic dose would be Phenergan or Tigan 25-50 mg IM. Other drugs such as Emetrol or Vistaril may also be used.

INTRAOPERATIVE PROCEDURES

As previously stated, the anesthesiologist is responsible for all anesthesia procedures. The first procedure is the induction of anesthesia which may involve several methods depending on the degree of patient resistance. At one MR/DD facility the types of induction procedures include the following: (a) intravenous Cannula, 10%; (b) single intravenous sodium pentothal push, 60%; (c) Nitrous Oxide gas induction, 25%; and (d) intramuscular Ketamine, 5%. The dentist and other staff must be prepared to assist the anesthesiologist in a difficult induction. After induction, the patient is intubated with an endotracheal tube via the nasal route or occasionally via oral intubation if nasal intubation is impossible. An oral intubation will obviously interfere with dental procedures. Most anesthesiologists will use a cuffed tube to prevent liquids and debris from entering the trachea. Other procedures, including establishing an IV line, placing cardiovascular and temperature monitors in place, protecting the patient's eyes and draping the patient are then accomplished. The dentist should confer with the anesthesiologist prior to the use of any agents affecting the cardiovascular or respiratory systems (i.e. epinephrine). The dentist should also help monitor any interference with peripheral blood supply caused by restraints, equipment or patient position.

The dentist first conducts a rapid but thorough oral examination particularly noting occlusion, presence/absence of fistulas, other soft tissue pathology, any unopposed teeth, general extent of dental decay, level of oral hygiene, and extent of subgingival and supragingival calculus. At this time the dentist will decide on (not transcribe) a general treatment plan and will discuss this with the anesthesiologist. The major component of this plan is the expected time of the case. There is no "typical" general anesthesia case. Each patient presents a unique combination of needs. However, a typical case time for an MR/DD adult with considerable unmet dental needs is in the range of 3-6 hours. Usually, only outpatients have a large amount of unmet dental needs. Most inpatients only require 1-2 hours. The prime issue for the dentist is to decide what procedures and compromises are necessary to provide the highest quality of care in an acceptable time frame. Only occasionally is a second general anesthesia session available for an individual patient.

The second procedure for the dentist is to take a complete set of intraoral radiographs including bitewings. The number of films necessary for a full series will vary. If adequate preoperative radiographs are possible, the patient is usually not a candidate for general anesthesia, except for some specific procedures (e.g. impactions). This may be the only time adequate radiographs will be possible. Most dentists prefer to take radiographs prior to throat pack placement because the throat pack protrudes the tongue and makes film packet placement difficult in the posterior areas. The taking of adequate radiographs with the patient in a supine position may be a unique experience for the dentist and require some practice. Most films must be operator assisted using a film holder (e.g. Snap-a-Ray). The operator, anesthesiologist and other staff present must wear adequate protective gear (e.g. lead-lined apron, gloves and thoracic collar) or use a barrier. The exposed film is then given to the circulating assistant to process. Special care should be taken since the need to retake a full radiograph series in an OR setting is a particularly frustrating event.

The third procedure is the placement of the throat pack to prevent debris from entering the throat and pharynx. The trachea is protected by the endotracheal tube cuff. A variety of pack types may be used including regular throat packs, single sections of rolled two inch gauze or double 4x4 gauze pads. These packs should be moistened to prevent mucosal damage and be neatly tucked to prevent entanglement with any rotary instrument used in restorative dentistry. If multiple packs are placed, a pack count should be noted.

The fourth procedure is to perform a prophylaxis while the radiographs are being processed. The thoroughness of the prophylaxis procedure depends on several factors including the procedures planned, the level of oral hygiene possible on a daily basis, and whether follow-up routine prophylaxes are realistic expectations. A typical thorough prophylaxis procedure is most common with emphasis on subgingival calculus removal and less emphasis on stain removal, especially on posterior teeth. The use of an ultrasonic scaler is indispensable for rapid removal of calculus. High volume suction is usually mandatory. As with most dental procedures, following a predetermined

sequence saves time. Minimal attention is given to teeth planned for extraction, they are often only brushed or swabbed with an antimicrobial agent (e.g. Peridex®).

The last procedure prior to actual treatment is to correlate the data obtained from the diagnostic radiographs with previously noted information, and to complete the treatment plan. The treatment plan should now be transcribed, usually by the circulating assistant. This treatment plan may need to be changed as events occur during treatment. Restorative treatment, including endodontic therapy should be completed prior to extraction or other surgery. The throat pack may be changed prior to surgery to eliminate the chance of debris (e.g., calculus or amalgam particles) contaminating the surgical site, especially if a double pack is used. After all treatment, including surgery, has been completed and hemorrhaging controlled, the throat pack(s) are removed by the dentist, the patient's face is cleaned and the responsibility for care is returned to the anesthesiologist.

MODIFICATIONS OF TREATMENT

Treatment modifications presented in Module 10 apply to general anesthesia cases. Three issues that dominate the treatment plan are: (a) the management of treatment within the time frame allotted, which relates to the total amount and type of treatment needed and the speed of the clinician, (b) the overwhelming need for durability of any restorations placed, and (c) the need to avoid any procedure that presents a significant risk of failure. The latter two issues are paramount in cases where no follow-up treatment is possible without general anesthesia.

Restorative Modifications

Amalgam is the restorative material of choice, often even in anterior teeth, due to superior durability. Composite restorations are primarily reserved for anterior teeth, especially maxillary anterior teeth, and only when esthetics is of significant concern. Pin amalgam restorations, amalgam restored cusps and stainless steel crowns, except in special circumstances, are usually contraindicated due to problems with durability. Over carving of amalgam restorations on posterior teeth is often indicated due to inability to check and confirm occlusion. Direct pulp capping is absolutely contraindicated and indirect pulp capping is usually contraindicated due to significant chance of failure. Anterior teeth requiring multiple composite restorations are often better restored with full coverage composite bonding. Badly broken down anterior teeth requiring a composite crown may best be restored using a posterior composite material due to superior material strength. Shortening of anterior crowns to improve crown/root ratios may be indicated. Significant or severe posterior occlusal adjustment, even to the extent of creating flat
planed occlusion, may prevent dislodging restorations. Meticulous attention to carving and finishing of restorations may be limited to allow more time for additional restorative or other treatment. Amalgam and composite margins should be extended to where visual examination and finishing are facilitated. The amalgam insertion sequence should be planned so that carving can begin immediately, and the composite insertion sequence so that finishing can be done at one time. Sealants are usually indicated in any posterior tooth without an occlusal restoration unless no probeable occlusal grooves are present. The application of topical fluoride after restorative procedures are completed is helpful. Posterior teeth with gingival decay on all four surfaces (common in patients who chew tobacco) are candidates for extraction, not restoration. The use of glass ionomer liners are helpful due to fluoride leaching, however, glass ionomer restorative materials are often contraindicated due to technique sensitivity and questions of durability. Severe enameloplasty on over erupted or malposed anterior teeth may provide a significant improvement in esthetics. The use of a rubber dam during restorative procedures may increase or decrease the time allotted for restorative procedures depending on the skill, speed and experience of the clinician. The use of a rubber dam is especially helpful when high volume suction is not available.

Endodontic Modifications

Endodontic decisions involve: (a) the expected degree of success of the procedure, (b) the ability to extract the tooth later under local anesthesia if failure occurs, (c) the expected expenditure of time for the procedure and (d) the relative importance of the tooth/teeth in question. Since the degree of success is highest for single rooted teeth, endodontic procedures under general anesthesia are usually limited to anterior teeth. Maxillary anterior teeth, particularly in patients with complete dentition, are often choices for endodontic procedures for esthetic reasons. Lower

anteriors usually have less esthetic value. If several anterior teeth are severely broken down due to caries, and restoration after endodontics is very time consuming, then extraction is probably the best choice. On the other hand, if no caries is present and only one or two anterior teeth have radiolucencies (usually due to trauma) then endodontics to preserve the arch may be indicated. Posterior teeth are rarely candidates for endodontic procedures under general anesthesia except to preserve a complete dentition, and in cases where extraction under local anesthesia is possible in case of endodontic failure. Where later extraction under local anesthesia is totally impossible, even with sedation and restraints, endodontic procedures are contraindicated for any tooth, anterior or posterior.

The time needed for endodontics must be weighed against other restorative and surgical needs. Therefore, single rooted teeth requiring little post-endodontic restoration are the best candidates when extensive restoration of the remaining dentition is needed or extensive time for surgery (e.g., impacted third molars) is needed. If other treatment needs are minor or moderate, however, time can be allocated to endodontics for maxillary anterior teeth that require extensive restoration but have high esthetic value.

Each situation, together with the speed and skill of the clinician, dictates the compromises in endodontic procedures. Less time than usual is spent on filing and meticulously preparing the canal for filling, especially in cases where an apicoectomy is planned. It should be remembered that a speeded-up or compromised root canal treatment, although reducing the degree of success, is often preferable to the option of extraction. Many clinicians are supportive of a preventive apicoectomy, especially where periapical pathology is present. This procedure increases the chance of success by: (a) removing the delta of accessory canals at the root apex, (b) confirming the integrity of the canal obturation and (c) removing the soft tissue pathology. For most experienced clinicians, the time needed for an apicoectomy (e.g., 10-15 minutes) is matched by the time saved in meticulous canal preparation and obturation.

The restoration of a badly broken down endodontically treated tooth usually requires a cemented post, accessory pins and an incremental build-up using light cured composite material (often posterior composite for strength). The choice of cement for the endodontic post should stress durability; often the choice is glass ionomer or unfilled resin bonded to dentin. The use of autopolymerized composite using a crown former offers a restorative choice, but is usually not considered as durable as incrementally placed light cured composite. If a build-up using posterior composite has been completed, a labial veneer of anterior composite will enhance esthetics.

Surgical Modifications

Most surgical modifications indicated in general anesthesia cases have been covered in Module 10. Most decisions involve the issue of expected tooth longevity. As previously reviewed, most pulpally involved posterior teeth should be extracted; most unopposed posterior teeth should be extracted; most impacted teeth should be extracted if time and clinician skill permits; most erupted third and second molars in patients with refractory poor oral hygiene should be extracted; most ectopically erupted teeth should be extracted; and most mobile teeth due to periodontal disease should be extracted. In some facilities the plan to extract nonfunctional teeth may be reviewed with the interdisciplinary team and/or parents or guardians prior to treatment. The use of resorbable sutures are almost always indicated and nearly complete control of hemorrhage prior to extubation is necessary to reduce postoperative complications. The use of a local anesthetic for surgical procedures has two advantages: (a) reduction of the need for postoperative analgesics, especially during the first 30 minutes post-extubation and (b) added hemorrhage control. The use of a local anesthetic with epinephrine is usually indicated but the anesthesiologist should be consulted prior to use. Local anesthesia is usually accomplished through infiltration techniques since mandibular blocks are seen as problematical by some clinicians. The total amount of local anesthesia may be limited by the anesthesiologist and all local infiltration anesthesia should be given 5-10 minutes prior to the surgical procedure if good hemorrhage control expected. The clinician should be aware that post-extubation hemorrhage control is impossible in most general anesthesia cases due to aggressive non-compliant behavior, and a second intubation to control serious hemorrhage would be a life-threatening and embarrassing event. Open sockets which cannot be closed by sutures may be packed with a resorbable surgical packing (e.g., Surgicel) which aids in hemorrhage control.

If the mandibular central incisors must be extracted because of advanced periodontal disease, the extrac-

tion of all four incisors should be considered, because it is common that lateral incisors will shift, loosen, and need extraction within one to two years. Esthetics here is less of a concern. Extensive alveoloplasty is not usually necessary after extraction of all teeth, because of the inability of the patient to wear dentures. Removal of sharp bony prominences is advisable, however, for the patient's comfort. The parents or guardians should be informed of possible emerging bone spicules, as they are often thought of as pieces of teeth. The parents should be informed before extraction of all the patient's teeth that it is not probable that dentures could be constructed or could be tolerated by the patient. Frenectomies often present unexpected hemorrhage problems; this procedure can be performed before other simple extractions to allow time for hemostasis.

Since complete preoperative radiographs are impossible in most general anesthesia cases, there always remains the chance of a surgical surprise for the general dentist. This usually consists of impacted teeth or other pathology that is beyond the surgical expertise of the general dentist, usually impacted cuspids, third molars and supernumerary teeth. Since many facilities will not have an oral surgeon on a standby basis, these conditions must be reserved for a second episode of general anesthesia for the specialist or merely monitored depending on the judgment of the general dentist and/or a subsequent specialist consultation.

Other Issues

When the general dentist is working with an oral surgeon, modification in the usual sequence of procedures is often required. The specialist's time often takes precedence. The general dentist will usually take the full series of radiographs, pack the throat and accomplish a rapid prophylaxis while the radiographs are being developed. The oral surgeon then performs the needed surgery. Afterward the general dentist completes any needed restorative or other procedures (including prophylaxis and root planing).

Occasionally the general dentist will work in tandem with a medical specialist required for a minor medical procedure (e.g., eye exam, toenail surgery). In these cases, the medical procedure is usually completed first.

In the rare event that full-mouth periodontal surgery is planned, a method for monitoring total blood loss is indicated. This is rarely needed for other surgical procedures.

PATIENT DISCHARGE

After the patient has fully recovered from the anesthesia, has voided and can take liquids by mouth without nausea/vomiting, he/she is discharged to the unit, if a resident, or to home if an outpatient. Occasionally patients, especially the elderly, have problems with postoperative voiding. The dentist may be asked to order catheterization of the patient. The dentist may also need to augment liquid nutrients of tube-fed patients with water. (e.g., 200 ml of water for each 200 ml of feeding liquid to prevent voiding problems). The discharge orders/procedures should include (a) diet instructions, (b) oral hygiene instructions, (c) any required analgesics or antibiotics and (d) any other information needed including recall expectations. Discharge orders are usually written by the dentist or the admitting physician. Most general anesthesia cases are discharged the day of the procedure. Occasionally, medical concerns will require an overnight stay in the hospital. Arrangements for this eventuality should be made in advance.

APPENDIX A

Examples of Institutional Facilities That Provide Dental Care Using General Anesthesia

Facility A (MR/DD facility)

Accomplishes 30-70 cases per year. The operating room is located in the dental clinic and reserved for dental cases, thus infection control does not differ from the rest of the clinic. An anesthesiologist is responsible for the anesthesia and is hired on a consultant basis by the Dental Program using dental budget monies. Recovery is accomplished on the skilled nursing unit which requires extra nursing and direct care staff. The program serves both residents (40%) and outpatients (60%). Approximately two days per month are set aside for general anesthesia cases, with one to three patients treated each day. Comprehensive dental services are provided. The dentist is responsible for all preoperative and postoperative orders and has admission and discharge privileges. Preoperative orders relate only to procedures planned and do not follow a specific hospital protocol as for extensive medical procedures. Most patients are served on a day patient basis; but occasionally outpatients are admitted the day prior to the procedures and both residents and outpatients may occasionally be held overnight. Parent/guardian apartments are available for outpatient families. Equipment is the same as any dental operatory, including wall mounted x-ray machine and dental lights. Supplies and instruments are quickly available from the main clinic if needed. A dental hygienist acts as assistant to the anesthesiologist and as circulating assistant. Pre-anesthesia physical evaluation (if possible) is done by a staff physician. Responsibility and authority for the entire arrangements are that of the dental program director.

Facility B (an MR/DD and MH facility)

Accomplishes 5-7 cases per year, but could accomplish 12 cases per year. Only one case per day is accomplished. Serves MR and MH clients and occasional resident cases referred by other MR/DD and MH facilities. No outpatients are served. Comprehensive dental services are provided. All procedures are done in a medical-surgical facility remote from the dental clinic. Presently utilizes a nurse anesthetist who is supervised by a physician from the surgery department. All procedures are done in one of four operating rooms where general surgery is also accomplished therefore infection control procedures are that for general surgery, including surgical scrub and gowning. All dental equipment is especially designed for OR functions (hospital grade) and contains special air supply, sterile water supply and is spark proof. A cumbersome mobile dental x-ray is used and only surgical, not dental lights are available. Preoperative orders are extensive (same as general surgery) and postoperative procedures are the same as a general hospital (e.g., requiring a dictated extensive surgical summary). The dentist has admitting and discharge privileges and writes all preoperative and post operative orders. Most patients are served on a day patient basis, but some may be kept overnight as needs dictate. Procedures for day patients are much simpler for the dentist, since admission and discharge procedures are avoided. All supplies, instruments and portable equipment come to the OR on large carts covered with sterile drapes, and are checked and/or loaded the day before the procedure by the dental staff. Nurses act as assistants to the nurse anesthetist and as circulating assistants. Pre-anesthetic physical evaluation is handled by the staff physicians. The entire program is the joint responsibility of the medical-surgical facility and the dental director, with the facilities requested by the dental director and the chief of the surgery department having final authority.

Facility C (an MR/DD facility)

Accomplishes 12 cases per year but could accomplish 24 cases per year. Only one case per day is accomplished. Some outpatients are served (<5%). The operating room is located in an MH institution 25 miles away. The dentist must discharge from the MR facility and admit to the MH facility and vice-versa upon completion of treatment. This procedure includes rewriting all routine orders. Pre-anesthetic evaluation is done by the MR facility physician and again by the MH facility physician. Patients are kept overnight at the MH facility prior to the procedure and discharged the day of the procedure. The OR is utilized for general surgery, therefore the highest standard of infection control is observed. The requirements for preoperative orders, postoperative orders and surgical summaries are for a general hospital (i.e., extensive). The OR utilizes a nurse anes-

thetist, thus responsibility is shared with the dentist. The dentist is considered the supervisor of the anesthetist. The OR is used by the dental program of one other MR facility (8 cases/year) and the MH facility (8 cases/year). Basic dental equipment is utilized together with a mobile dental x-ray unit and surgical lights. Each facility has its own mobile (Sears) tool cart used to store needed supplies and small equipment. All supplies and instruments are redundant (two of everything). The dentist utilizes two assistants and there is also a circulating nurse. The patient is recovered in the recovery room and discharged directly back to the MR facility. The dentist has admission and discharge privileges. Patients can be kept overnight postoperatively if needed. Oral surgeons are available for surgery or combined cases. Occasionally dental care may be combined with other needed minor medical procedures.

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APPENDIX B

Examples of Preoperative/postoperative Orders

(Note: Not all procedures or drugs are appropriate for all patients. Drug doses, especially, will vary between patients. The dentist should be aware of the patient's medical history and prescribe accordingly.)

Facility A (an MR/DD facility)
Preoperative Orders:
1. Pre-general anesthetic physical exam (if possible)
2. CBC, (if blood sample possible)
3. Urinalysis
4. NPO after midnight (except needed anticonvulsant medications or antibiotics as described previously)
5. Chloral hydrate, 1 gm prn h.s. (for outpatients only)
6. Atropine 0.4 mg IM, 45 minutes prior to general anesthesia (if possible), avoid if patient presents tachycardia
7. Bleeding time, usually taken after general anesthesia (due to behavior) on certain cases where bleeding may be of concern (e.g. history of bleeding or on drugs such as Depakene)

Postoperative Orders:
1. Monitor vital signs q 15 minutes until stable
2. Liquid diet (often changed later in day to soft diet)
3. Analgesic IM (usually Meperdine, 50-100 mg IM)
5. Analgesic PO (usually Tylenol #3, 1 or 2 tabs q 4-6 hr)
6. Postoperative orders for ice packs are often not successful due to patient behavior

Facility B (an MR/MH facility)
Preoperative Orders:
1. Pre-general anesthetic physical exam, including EKG and chest film.
2. NPO after midnight
3. Laboratory orders include: CBC, PT, PTT, BUN, urinalysis, fasting blood sugar, electrolytes, creatinine

Postoperative Orders:
1. Summary of procedures accomplished in the progress notes
2. Dictation of an operative technique report which describes the procedures accomplished in precise detail
3. Postoperative instructions for staff physicians concerning diet, antibiotics, analgesics and other follow-up requirements
4. Any teeth, bone or soft tissue removed are submitted to a pathology lab for analysis
5. Completion of discharge summary (not for "day patients")

Facility C (an MR/DD facility)
(Patients treated in MH facility)
Preoperative Orders
1. Medical history and physical exam
2. Coagulation test: PT, PTT
3. Urinalysis
4. Chest film/reading consults
5. Hematology: CBC
6. EKG

7. Chemistry: fasting glucose, BUN, sodium, potassium, chloride, CO_2, creatinine, total protein, albumen, total bilirubin, calcium, alkalynphosphotase, AST (SGOT), ALT (SGPT)
8. NPO after midnight
9. Zantac, 150 mg PO H.S. and 150 mg PO at 6:30 a.m. day of treatment
10. Robinul 0.2 mg IM prn (Day of)
11. Valium 10mg PO prn (Day of)
12. Continue routine a.m. seizure meds/cardiac meds (a.m. behavior modification drugs omitted)

Postoperative Orders

1. Vital signs q 15 minutes until stable
2. D/C IV when vital signs are stable
3. Analgesics and antibiotics rarely prescribed
4. Diet orders