CHAPTER 1

1 In-Hospital Care of the Dental Patient

Dental Admissions

Introduction

Both the medical health and the dental needs of patients must be considered when deciding on hospital admission. Hospital admission should be considered whenever the required treatment could threaten the patient's well-being, or indeed life, or when the patient's medical problems may seriously compromise the treatment.

Reasons for Admission

The reasons for admission to the hospital can be categorized into two groups: emergent hospitalizations, usually from the emergency department, or elective/scheduled hospitalizations for specific oral surgical or dental procedures.

Fractures of the Mandible/Maxillofacial Structures Admission to the hospital is necessary for the management of multisystem injuries or injuries concomitant to mandible/maxillofacial fractures. It may be required for medically complex or special needs patients.

Infection Admission is necessary if the patient has an infection that:

- Compromises nutrition or hydration (especially fluid intake, e.g., severe herpetic stomatitis in very young children, which might require hospitalization because of dehydration)

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- Compromises the airway (e.g., Ludwig's angina)
- Involves secondary soft tissue planes that drain or traverse potential areas of particular hazard and so are a danger to the patient (e.g., retropharyngeal or infratemporal abscesses)

Compromised Patients Medically, mentally, or physically compromised patients who are insufficiently cooperative to be treated in an outpatient setting may be admitted to hospital for their procedure. This category includes patients who might require general anesthesia or deep sedation and/or appropriate cardiorespiratory monitoring during treatment (e.g., anxiety disorders).

Children Young children who require treatment under deep sedation or general anesthesia because of the combination of poor cooperation and the need for a large number of dental procedures as a result of extensive caries and/or consequent infection may be admitted to the hospital.

Medical Consultations

Objectives

The objectives of medical consultations are to:

- Determine and reduce peri- and postoperative medical risk to the patient from the planned oral surgical/dental procedures
- Determine, and thus lessen or indeed prevent, the effects of the proposed surgery/procedures on any medical illness and limit possible post-procedure complications by managing and treating the patient's underlying medical conditions

The Patient's Medical History

The Admission Note

Introduction

There is an art to eliciting the correct, pertinent, and relevant information regarding a patient's current medical and physical status. Taking an accurate, relevant, and concise medical history requires repeated practice and experience. The goal is to obtain sufficient information from the patient to facilitate the physical examination and, in conjunction with the examination, to arrive at a working diagnosis or diagnoses of the problem.

Old hospital records, if they exist, can be immeasurably helpful in providing information about past hospitalizations, operations (including complications), and medications, particularly if the reliability of the patient or guardian as an informant is in question.

Key Points for Taking a Medical History

- Record the patient's positive and negative responses.
- Remember that the patient might not understand the need for, and value of, an accurate medical history in the dental setting.
- Be persistent and patient.
- Confirm the veracity of the information by reframing the questions (e.g., ask patients to list their current medical problems; a bit later ask for a list of their current medications; follow this up by asking the patient to detail what each specific drug/medication is used for).
- If you need to use an interpreter, try as much as possible to use a professional healthcare interpreter and not members of the patient's family.
- If you need to gain consent for minors and intellectually impaired adults or elders, make sure that the person whose consent you gain (patient's parent/guardian/caregiver) has the legal authority to provide consent.

Elements of the History

The following discussion of the components of the medical history is directed at providing a full and complete history. Often, a shorter form of the medical history is sufficient for a healthy patient admitted for routine care (e.g., extraction of teeth).

Informant and Reliability Note the name of the person or material used to obtain the pertinent information (e.g., patient, parent, relative, medical/nursing record). Also note whether the informant was reliable—were your questions understood, was the informant coherent and knowledgeable, and how well does he or she know the patient?

Chief Complaint (CC) Record what patients perceive to be the problem that brought them to the hospital. The patient's own words should be used if possible.

History of Present Illness (HPI) Make a chronologic description of the development of the chief complaint. Record the following:

- When the symptoms started
- The course since onset—the duration and progression
- Whether the symptoms are constant or episodic (if episodic, note the nature and duration of any periods of remission and exacerbation)
- The character of the symptoms (e.g., sharp, dull, burning, aching) and severity (e.g., impact on daily living)
- Any systemic signs and/or symptoms (e.g., weight gain or loss, chills, fever)
- Previous diagnoses and the results of previous trials (success, partial resolution, or unsuccessful) with treatment and/or medication related to the chief complaint

Past Dental History You now need to gather as full a past dental history as possible. Ask the patient about:

- Previous oral surgery, orthodontics (age, duration), periodontics, endodontics (tooth, date, reason), prosthetics, other appliances, oral mucosal problems (e.g., secondary herpes, aphthae), dental trauma
- Frequency of dental visits (regular or emergency only)
- Frequency of dental cleanings (when were the patient's teeth last cleaned?)
- Experience with local anesthesia/sedation (if possible, find out what type was used) and general anesthesia (e.g., allergy, syncope) (Appendix 12, Table A12-7)
- Experience with extractions—was there postoperative bleeding or infection? How well did they heal?
- History of pain, swelling, bleeding, abscess, toothaches
- Temporomandibular joint—history of pain, clicking, subluxation, trismus, crepitus
- Habits including nail-biting, thumb-sucking, clenching, bruxing, mouth-breathing
- Fluoride exposure—was this systemic or topical?
- Home care—brushing method and frequency, instruction, floss or other aids; caregiver assistance required?
- Food habits/diet—ask about form and frequency of sucrose exposure (including liquid oral medicines). For children, the history and frequency of bottle and breastfeeding as well as between-meal snacking should be included. Find out about nutritional supplements (form and consistency), liquid diets, tube feedings
- Problems with saliva (hyper-/hypo-salivation) chewing, speech
- Negative dental experiences

Past Medical History (PMH) Direct questioning is probably the best way to elicit the patient's past medical history.

Ask the patient "Are you being treated for anything by your doctor at the moment?" If the answer is "Yes," ascertain how severe the condition is (the extent to which it interferes in daily living activities) and how stable it is. A severe condition (e.g., angina) might prove not to be a significant hindrance to planned dental treatment as long as it is well managed and stable. However, a patient with unstable angina should not be treated until the angina is stabilized, or if this is not practical, treatment should be planned while the patient is monitored, and possibly lightly sedated, to minimize stress and anxiety.

Ask the patient "Have you been treated in the past, or are you currently being treated for any of the following":

- Rheumatic fever, heart murmurs, infective endocarditis, angina, heart attack, or an irregular heart beat
- Asthma, emphysema, hay fever, or allergic rhinitis or sinusitis
- Epilepsy, stroke, or nervous or psychiatric conditions?
- Diabetes or thyroid conditions
- Peptic or gastric ulcer disease or liver disease (e.g., hepatitis or cirrhosis)
- Kidney problems: Obstruction, stones, or infection

- Urinary problems: Obstruction or infection
- Gynecologic or "women's" problems. Ask, "Are you pregnant?"
- Rheumatoid or osteoarthritis, osteoporosis, back or spinal problems
- Skin cancer or rashes
- HIV
- Infection requiring antibiotics
- Ask "Do you have a prosthetic valve or joint?"

If the patient is currently receiving treatment for cancer, find out the mode and schedule of treatment (surgery, chemotherapy, or radiotherapy). Finally, ask if the patient has ever required a blood transfusion or other blood products (platelets, plasma, or clotting factors).

Review of Systems

As part of the past medical history, you need to question the patient systematically about all of the body systems. It is often possible to obtain significant additional symptoms or information not elicited in the discussion of the patient's past and present illness. A positive ("yes") response should be probed in depth and significant negatives ("no") must also be noted.

General This includes weight loss or gain, anorexia, general health throughout life, strength and energy, fever, chills, and night sweats.

Cardiovascular This includes palpitations, chest pain or pressure with or without radiation, orthopnea (number of pillows), cyanosis, edema, varicosities, phlebitis, and exercise tolerance.

Respiratory Ask about cough, sputum production (taste, color, consistency, odor, amount/24 hours) hemoptysis, dyspnea, wheezing, cyanosis, fainting, and pain with deep inspiration.

Neurologic Questions about this system should include loss of smell, taste, or vision; muscle weakness or wasting; muscle stiffness; paresthesia; anesthesias; lack of coordination; tremors; syncope; fatigue; aphasias; memory changes; and paralysis.

Psychiatric/Emotional Ask about general mood, problems with "nerves," bruxism/clenching, habits or tics, insomnia, hallucinations, delusions, and medications. Ask children about sleeping patterns and night terrors/nightmares.

Endocrine This includes goiter, hot/cold intolerance, voice changes, changes in body contours, changes in hair patterns, polydypsia, polyuria, and polyphagia.

Gastrointestinal Questions about this system should include appetite; food intolerance; belching; indigestion and relief; hiccups; abdominal pains; radiation of pain; nausea and vomiting; hematemesis; cramping; stool color and odor; flatulence; steatorrhea; diarrhea; constipation; mucus in stools; hemorrhoids; hepatitis; jaundice; alcohol abuse; ascites; and ulcers.

Genitourinary This includes urinary frequency (day and night), changes in stream, difficulty starting or stopping stream, dysuria, hematuria, pyuria, urinary tract infections, impotence, libido alterations, venereal disease, genital sores, incontinence, and sterility.

Gynecologic Ask about gravida/para (pregnancies/live births) and complications, abortions or miscarriages, menstrual history, premenstrual tension, painful or difficult menstruation (dysmenorrhea), bleeding between periods, clots of blood, excessive menses (menorrhagia), frequency, regularity, date of last period, menopause (date, symptoms, treatment), postmenopausal bleeding.

Breasts This includes development, lumps, pain, discharge, and family history of breast cancer.

Musculoskeletal Questions about this system should include trauma, fractures, lacerations, dislocations with decreased function, arthritis, inflamed joints, arthralgias, bursitis, myalgias, muscle weakness, limitation of motion, claudication, and gait.

Dermatologic Inquire about hair or nail changes, scaling, dryness or sweating, pigmentation changes, jaundice, lesions, pruritus, biopsies, piercing, and tattoos.

Head, Eyes, Ears, Nose, Throat (HEENT) Questions should include:

- Head: Headache, fainting, vertigo, dizziness, pains in head or face, and trauma
- Eyes: Vision, glasses, trauma, diplopia, scotomata, blind spots, tunnel vision, blurring, pain, swelling, redness, tearing, dryness, burning, and photophobia
- Ears: Decreased hearing or deafness, pain, bleeding or discharge, ruptured ear drum, clogging, and ringing
- Nose: Epistaxis, discharge (amount, color, consistency), congestion, colds, change in sense of smell or taste, and polyps
- Mouth and throat: Pain, sore throat, dental pain, dental hygiene history, bleeding or painful gums, sore tongue, lesions, bad taste in mouth, loose teeth, halitosis, dysphagia, temporomandibular joint dysfunction, trismus, hiccups, voice changes, neck stiffness, nodes or lumps, and trauma

Hematologic This includes increased bruising, bleeding problems, nodes or lumps, and anemia.

Family History

Find out what illnesses the patient's grandparents, parents, siblings, and children have/had. If any of these relatives are dead, at what age did they die and what was the cause? Ask about family history of tuberculosis, diabetes, heart disease, hypertension, allergies, bleeding problems, jaundice, gout, epilepsy, birth defects, breast cancer, and psychiatric problems.

Social History

Ask about the patient's home life, education, occupational history (including military, if applicable), family closeness, domestic violence, normal daily activities, financial pressures, sexual relationship(s), recreational drugs use, and tobacco and alcohol history. A good question to ask is "What will you do when you get better?"

History for Pediatric Patients (Infants and Children)

Generally, history taking is similar for a pediatric patient as for an adult patient. However, unlike the adult history, much of the history for a child is taken from the parent or guardian. If the child is old enough, it is a good idea to interview the child as well. There are two basic rules when interviewing children: Do not ask too many questions too quickly, and use age-appropriate language. Special emphasis should be placed on the following areas.

Prenatal and Perinatal History Was the child full term or premature? Were there any complications during pregnancy? What was the perinatal course:

- Hospitalizations: Reasons and dates
- Operations: Procedures and dates, including anesthetic used and any complications
- Allergies: Medications, foods, tapes, soaps, and latex. Include a note on the type of reaction. Be careful to differentiate between true hypersensitivity/allergy reactions and adverse side effects
- Medications past and present: Dose and frequency, prescription and over-the-counter (including topical agents)
- Potential exposure to dangerous or easily transmissible infections: Tuberculosis, venereal disease, hepatitis, flu, HIV, and prion disease (UK)
- Maternal immunizations: Tetanus, rubella, hepatitis
- Transfusions
- Trauma
- Diet while pregnant
- Maternal habits: Alcohol intake, tobacco, and recreational drugs

Postnatal History It is also important to look into:

- Immunization status: Is the child up to date with immunizations?
- Infection: Has the child had recent exposure to childhood infections (e.g., cold, flu, chickenpox, rubella, or mumps) because this may be sufficient cause to postpone elective surgery. Also ask about acute otitis history.
- Nutrition: Was the child bottle- or breastfed? What was the frequency and duration of feedings? At what age was the child weaned? Does the child have any food allergies? Is there any history with fluoride?
- Personal or family history of complications from general anesthesia.
- Growth and development: attainment of developmental milestones (physical, cognitive, social and emotional, speech and language, and fine and gross motor skills).

- School status.
- Significant febrile episodes in early childhood.
- Social history: What is the home environment (e.g., smokers at home, pets, main caregiver)? What are the parental arrangements and custody, sequence of patient among siblings, siblings (number, ages, health status, social arrangements [e.g., living at home])?

Physical Examination

Introduction

Depending on training and dental practice laws, dentists might be responsible for completing a full physical examination when admitting a patient. The admitting dentist will certainly be responsible for the detailed examination of the oral cavity and must be able to interpret the results of the history, physical examination, and laboratory tests. Whenever possible, the physical examination should be completed in a systematic manner, so that nothing is omitted, although physical limitations of the patient might preclude this.

Elements of the Physical Examination

Start the physical examination by giving a statement of the setting in which the examination was performed and a gauge of the reliability of the examination (i.e., whether you were able to perform a full exam).

General Inspection

Note the patient's apparent age, race, sex, build, posture, body movement, voice, speech disorders, nutritional/hydration status, and facial or skeletal deformities or asymmetries.

Vital Signs

- Pulse: If irregular, measure the apical pulse and note its beat as "regularly irregular" or "irregularly irregular."
- Blood pressure: Take in both arms with the patient sitting, supine, and standing.
- Temperature: Note the site at which the temperature was recorded.
- Respiratory rate.
- Height, weight (for a child record the percentile height/weight).
- Global pain score on a scale of 1 to 10 (1 = no pain and 10 = worst possible pain).

Integument

Note the color/pigmentation, texture, state of hydration (turgor), temperature, vascular changes, lesions, scars, hair type and distribution, nail changes, tattoos, and piercing.

Head, Eyes, Ears, Nose, Throat

- Head: Note the size (normally noted as normocephalic) and palpate for swelling, tenderness, injuries, and symmetry. Take an actual measurement of the circumference in centimeters in children.
- Eyes:
  - Visual acuity: If corrected, the degree should be estimated
  - Periorbital tissues: Edema, discoloration, and ptosis
  - Exophthalmos/enophthalmos
  - Conjunctiva and sclera: Pigmentation, dryness, abnormal tearing, lesions, edema, hyperemia, and icterus
  - Oculomotor: PERRLA (pupils equal, round, react to light and accommodation), EOMI (extraocular movements intact) or gaze restricted, nystagmus, and strabismus
  - Fundoscopy: Optic disc (size, shape, color, depression, margins, vessels), macula, periphery, light reflexes, exudates, and edema
- Ears: Hearing (watch tick, hair manipulation, whisper, Rinne and Weber tests when indicated), external auditory canal, tympanic membranes, mastoids, wax, and discharge
- Nose: Septum (position, lesions), discharge, polyps, obstruction, turbinates, and sinus tenderness to palpation (if necessary, transilluminate)
- Mouth and throat:
  - Lips: Color and lesions
  - Teeth: Hygiene, decayed, missing or filled teeth, mobility, prostheses, and occlusion. Record the developmental status in children (primary, mixed) and whether this is appropriate for the chronological age (Appendix 22).
  - Gingiva: Color, texture, size, bleeding, lesions, and recession
  - Buccal mucosa: Color, lesions, and salivary flow from parotid glands, Stensen's ducts
  - Floor of mouth: Color, lesions, and salivary flow from submandibular/sublingual glands, Wharton's ducts
  - Tongue: Color, lesions, papillary distribution or changes, movement, and taste (if indicated)
  - Hard and soft palate: Color, lesions, deformities, petechiae, and movement of soft palate
  - Oropharynx: Tonsillar pillars, color, lesions, and gag reflex
  - Temporomandibular joint (TMJ): Click, pop, crepitus, tenderness, and trismus from a variety of problems (e.g., infection, micrognathia, scleroderma, arthritis)
  - Muscles of mastication: Tenderness and spasm

Neck

- Lymph nodes: Deep cervical, posterior cervical, occipital, supraclavicular, preauricular, posterior auricular, tonsillar, submaxillary, sublingual, and submental
- Trachea: Position and movement with swallowing
- Thyroid: Size, consistency, tenderness, mobility, masses, and bruits

- Throat/neck: Dysphagia, carotid bruits, jugular venous distention (JVD), and hoarseness
- Cervical spine: Mobility, posture, pain, and muscle spasm

Thorax

- Observation: Symmetry, size, scars, shape, anteroposterior dimension, and respiratory excursions
- Percussion: Resonance or dullness and where located, and tactile fremitus
- Auscultation: Breath sounds, stridor, wheezing, rales, rubs, rhonchi.

Breasts

See Box 1.1.

- Size
- Symmetry
- Lesions
- Stippling
- Discharge
- Masses
- Tenderness
- Tanner stage (in children and adolescents)
- Gynecomastia (in males)

Cardiovascular

- Point of maximal impulse (PMI): Inspect and palpate for PMI, noting location and character, thrills, and heaves.
- Auscultate: Note ate and rhythm (regular vs. irregular), murmurs, friction rubs, gallops, and other abnormal sounds. When indicated, changes in heart sounds with exercise or change of position should be noted.
- Edema: Note location, degree, extent, tenderness, and temperature.
- Arteries: The carotid, superficial temporal (facial), brachial, radial, femoral, ulnar, popliteal, posterior tibial, and dorsalis pedis pulses should be palpated for strength, character, and equality.
- Veins: Note pressure, varicosities, cyanosis, rubor, and tenderness.

Abdomen

- Appearance: Size, shape, symmetry, pigmentation, and scars
- Auscultation: Bowel sounds, peristaltic rushes, and bruits

Box 1.1. Sensible Precautions When Examining a Patient

The breast and genetourinary examinations are routinely deferred. Make sure that a chaperone is present during the examination.

- Percussion: Note borders of organs and fluid, areas of tympany, hyperresonance, dullness or flatness, shifting dullness, and tenderness
- Palpation: Size of the abdominal aorta and pulsations, liver, spleen, kidneys, masses, fluid wave, tenderness, guarding, rebound tenderness, hernia, and inguinal adenopathy

Genitalia (When Appropriate)

See Box 1.1.

Male Note development, penile scars or lesions, urethral discharge, testes descended, hernia, tenderness, masses, and circumcision.

Female

- External examination: Hair, skin, labia, clitoris, Bartholin's and Skene's glands, urethral discharge, vaginal discharge, and lesions
- Internal examination: Cervix, uterus, ovaries (masses, tenderness, lesions), and indication of pregnancy

Anorectal

Record hemorrhoids, skin tags, fissures, rectal sphincter tone, masses, strictures, character of stool, and guaiac stool. In males, prostate size, consistency, nodularity, and tenderness should also be noted.

Extremities

Note proportions (to each other and to entire body), amputations, deformities, finger clubbing, cyanosis, koilonychia, edema, erythema, enlargement, tenderness, range of motion of joints, cords, muscle atrophy, strength, swelling, spasm, and tenderness.

Spine

Note alignment and curvature, range of motion, tenderness to palpation and percussion, and muscle tone.

Neurologic

- Appropriateness; alertness; orientation to person, place, time, and situation; recall for past and present. For adults aged 55 and older whose responses to questions seem inconsistent, the Mini Mental State Exam (MMSE) can be used to check the possibility of dementing illness or other insidious, progressive cognitive impairment that might call into question the patient's ability to provide informed consent and a thorough history. If there is evidence of injury or cortical disease, further tests are indicated.
- Impaired sensorium: Assess the magnitude and degree of as well as the type of neurologic deficit.

- Meningeal signs (if indicated): Stiff neck, Kernig and Brudzinski signs.
- Cranial nerves: See Appendix 9.

Musculoskeletal

Check for tenderness, swelling or deformities of the joints.

Concluding the Admission Workup and Note

- Assessment (problem list): List the patient's differential diagnosis derived from the history, physical examination, and old records.
- Plan: Include further diagnostic tests, procedures, medical therapies, or surgeries.

Admission Orders

Introduction

Admission orders are generally the first orders written on a patient following admission (Box 1.2). As such, they must include all aspects of the patient's care and comfort, taking into account both the environmental factors and the proposed therapeutic procedures. Orders are a major link between dental and nursing staff in providing patient care. Many needless phone calls can be avoided if the orders are precise, intelligible, and legible. Like any other entry in the chart, they become part of the permanent medical and legal record. They should be signed and dated, and the time should be noted.

Box 1.2. Elements of the Admission Orders

Disposition: Admit to (floor, service, and attending dentist)
Diagnosis (reason for admission): Actual or provisional, other significant medical problems
Condition: Good, fair, poor, and critical are adequately descriptive
Allergies: Allergies of any sort—food or drug—should be included, but specifically you should inquire as to penicillin and other antibiotics, aspirin, codeine, iodide preparations, latex, and surgical tape. Also note any medications contraindicated secondary to concomitant disease(s) or cross-reactivity with other medications
Patient monitoring: Vital signs should be monitored every two, four, and six hours/shift or routine. Specific requests for varying monitoring depend on the patient's condition (e.g., check for stridor, call house officer if temperature is above 101°F (38.5°C)

Activity: Should be consistent with patient's condition (e.g., out of bed ad lib, bathroom privileges, up with assistance, chair, bedrest). For children: Detail the required supervision and restraints (e.g., bed rails, consent for restraints)

Diet: Should be normal, soft, mechanical soft, full liquids, clear liquids, or nil by mouth (NPO; indicate time). Diet can be modified if this is made necessary by concomitant disease state(s) such as diabetes, renal failure, hypertension (e.g., American Diabetes Association 1,500 calories, no added salt [NAS[, fluid restrictions, force fluids)

Diagnostic tests: Testing should be determined based on the admission assessment and diagnostic plan. Examples include:

- Routine: Complete blood cell count, differential, electrolytes, prothrombin time with international normalized ratio (INR), partial thromboplastin time, type and hold, or type and crossmatch; sickle screen when indicated
- Electrocardiogram, chest X-ray, and urinalysis
- When indicated: Blood gases, cultures, cytology, endocrine studies, liver enzymes, hepatitis and HIV studies, pulmonary function tests
- Additional X-rays as indicated

Pediatric patients: Complete blood cell count with differential and urinalysis. Sickle screen when indicated. Additional tests should be requested as indicated by medical history and physical examination. Same-day surgery admissions in many hospitals permit a fingerstick hematocrit for well children before elective surgery

IV fluids: Both composition of fluid and rate of infusion should be specified, taking into account existing and potential deficiencies

Medications: For routine medications taken by the patient, the regimen might need to be adjusted according to the present physical status and procedure planned. Also note the medications to be started on admission—dosage and administration schedule

Input: Amount and composition of fluid intake, both PO and IV

Output: Fluid lost from all sources (urine, vomitus, nasogastric tube, fistula, wound drainage). Note: Weight is often followed daily to monitor fluid balance

Consults: Service or individual to whom consult is directed, a brief description of the patient's current medical problem(s), planned procedures and specific information sought

Special procedures

- Monitors: Telemetry
- Foley catheterization
- Ice packs/heat packs: Location, time on/off
- Wound care: Dressing changes, irrigation, and precautions
- Specific preparations for additional tests
- Position of bed (e.g., head of bed elevated 30°)
- Suction/lavage
- Deep venous thrombosis (DVT) prophylaxis: Compression stockings

Precautions: Side rails, seizures, bleeding, respiratory, neutropenia, scissors or wirecutters at bedside, etc.

Overview of Patient Admission Procedures

Admission Arrangements

For elective/scheduled hospitalizations, the admissions office will want to know the patient's name, address, telephone number, mother's or father's (guardian's) name (if the patient is under the age of consent), preoperative diagnosis, procedure to be performed, and whether blood products will be needed. Requests for admission, use of operating room, radiographs, and any necessary laboratory work also should be made at this time.

Patient Contact

Patients should be contacted and told of the admission and surgery dates and the scheduled time for scheduled hospitalizations/surgery. Patients should be advised to continue taking all medications consistent with the anesthesia department's policies and not to stop taking appropriate medications before admission simply because they are "going to the hospital." Once admitted, notes will be written to ensure that the appropriate medications are continued.

Hospital Contact with Patient

If your hospital has a preadmission questionnaire, patients should be asked to complete this and return it to the hospital.

A complete history and physical examination should be performed either on the day a patient is admitted to the hospital or before admission. The requested laboratory procedures will be completed and the results placed in the record while the patient is in the hospital awaiting surgery. The surgical consent form should be completed, explained to the patient, and signed according to hospital policy, if not already done prior to admission. If the patient is judged not to have the capacity to give consent because of intellectual impairment, the agreement of parents or legal guardians must be sought.

Preoperative Considerations

Prophylactic Antibiotics (Secondary Prophylaxis)

Preoperative antibiotics are routinely given before invasive procedures and are performed on some specific medically complex patients. The appropriate national regimen for endocarditis prophylaxis should be followed for patients at risk of developing this life-threatening problem. In the United States, the American Heart Association (AHA) has developed guidelines (Appendix 23, Table A23-1); the United

Kingdom follows the NICE guidelines (Appendix 23, Table A23-2). Because an intravenous (IV) line is typically in place for operating room procedures, and the patient is required to fast before surgery, the IV route is preferred.

Selecting the Anesthetic Technique

Local/Regional Anesthetic

Local/regional anesthetic should be used for minor procedures and as an adjunct to IV sedation or general anesthesia.

Nitrous Oxide/Oxygen

Consider whether the patient is suitable for conscious sedation using nitrous oxide and oxygen.

IV Sedation

IV sedation should be considered for:

- Anxious patients who need a procedure of any magnitude
- Patients who are unresponsive or not cooperative
- Medically compromised patients who need stress reduction

General Anesthesia

General anesthesia should be administered:

- For extensive or very painful procedures
- For patients with a profound gag reflex
- When protection of airway with endotracheal tube is desirable
- When hypotensive anesthesia is necessary

Risk Assessment

Patient-Related

The most critical type of risk is patient-related. A thorough history and physical examination is necessary to ascertain the extent of patient-related risk. Cardiac and respiratory diseases are the greatest causes of increased perioperative morbidity and mortality. Be aware of the increasing use of medications, including complementary (e.g., St John's wort), which might interfere with blood coagulation or produce other drug reactions. Appropriate laboratory studies should be obtained to adequately evaluate clinical findings preoperatively.

The American Society of Anesthesiologists (ASA) classification of physical status is the most common form of preanesthetic risk assessment (Appendix 6, Table A6-1).

Procedure-Related

Dental and oral/maxillofacial surgical procedures are typically associated with minimal morbidity or mortality. The treatment of severe infections with airway compromise and the management of maxillofacial trauma carry the highest risk.

Anesthesia-Related

Recent advances in anesthetic monitoring equipment and techniques have reduced anesthetic-related morbidity and mortality. The most common risks include aspiration and other airway disturbances, hypo-/hypervolemia, and human error. Rare, but important, risks also include malignant hyperthermia, dysrhythmias, seizures, myocardial infarction, and hepatitis.

Provider-Related

Complications tend to decrease with practitioner experience and institutional experience. Outcomes assessment is necessary to ensure that the highest quality of care is given.

Laboratory Studies

As a requirement for admission to many hospitals the patient will need to undergo:

- Hematocrit to check for anemia
- Pregnancy test for females of childbearing age. Urine human chorionic gonadotrophin (hCG) is the most commonly used test. It is less expensive than others, but also less sensitive. Serum quantitative hCG is more sensitive in very early pregnancy but more expensive
- Urinalysis

Other commonly requested tests based upon history and physical evaluation are shown in Box 1.3.

Box 1.3. Common Tests for Hospital Admission

Most hospitals have established criteria for preoperative laboratory screening, which must be followed. Common tests include:

- Complete blood count (hemoglobin, hematocrit—not always necessary for healthy children—leukocyte count, platelet count): Anemia, infection, immune status, platelet deficiency
- Coagulation studies (e.g., prothrombin time/international normalized ratio [INR])
- Serum electrolytes (Na, Cl, K, CO_2, BUN, Cr, glucose): Metabolic disturbance (e.g., kidney failure, diabetes)
- Toxicology screen: Drug use, levels of seizure medication
- Blood for typing if there might be a need for transfusion

- Urinalysis: Urinary tract infections, hydration, kidney function
- Liver function tests: Alanine aminotransferase (ALT), aspartate aminotransferase (AST), lactic dehydrogenase (LDH), bilirubin, and alkaline phosphatase
- Posterior/anterior and lateral chest radiographs: Cardiopulmonary anomalies (e.g., pneumonia, pulmonary edema)
- Electrocardiogram: Dysrhythmia, conduction abnormalities

Prevention of Aspiration

Patients undergoing IV sedation or general anesthesia should not consume anything by mouth (NPO) within a specified number of hours prior to anesthetic induction, depending on institutional policy and the age of the patient. See Box 1.4, below. You must ensure that these instructions have been strictly followed by questioning the patient before going to the operating room (OR). An empty stomach decreases the gastric volume and hence the risk of aspiration.

Pulmonary Embolism Prophylaxis

The risk of venous thromboembolism (VTE) and potential life-threatening pulmonary embolism depends on both surgical (length of procedure, degree of immobilization) and patient-specific (age, comorbidity, hypercoagulable state) variables. Patients are stratified into surgical risk groups based on these variables. Every hospital should have a formal written thromboprophyaxis policy based on the most recent

Box 1.4. Elements of the Preoperative Summary

General statement: For example, "Healthy, 16-year-old intellectually impaired male admitted to (give the location) for (name the procedure or reason for admission)."
Diagnosis: List all current medical problems.
Physical examination: Indicate whether this was within normal limits or if there were abnormalities.
Vital signs
Allergies
Chest X-ray: Pertinent findings should be noted. If the film is clear, no active disease should be indicated.
Electrocardiogram: Note rate, rhythm, and any abnormalities.
Chemistries: Note results and any abnormalities.
Complete blood cell count: Note results and any abnormalities.
Sickle screen: Results should be noted, and if positive, electrophoresis requested to determine the percentage hemoglobin S.
Prothrombin time/international normalized ratio (INR) and partial thromboplastin time: Note results and any abnormalities.
Urinalysis: Note results and any abnormalities.
Operative consent: Must be signed and in chart.
Blood: If blood replacement is anticipated, the number of units requisitioned should be indicated and whether for type and hold or type and cross.
Plan: For example, "To OR in a.m. for full-mouth rehabilitation."

national guidelines. It is important to be familiar with the practices of your hospital.

- Low-risk patients: Thromboprophylaxis is not recommended for low risk patients.
- Moderate- and high-risk patients: Unless contraindicated, low molecular weight heparin (LMWH), low dose unfractionated heparin, or fondaparinux should be used according hospital policy. When anticoagulation is contraindicated, mechanical thromboprophylaxis with pneumatic or elastic stockings should be used.

Prevention of Adrenal Crisis

Patients who have been or are currently on systemic steroids may be at risk for an adrenal (Addisonian) crisis during or after a stressful event such as a surgical procedure or general anesthetic. The issue of prophylactic steroids prior to dental procedures is controversial, and the risk of an adrenal crisis in the dental setting is unknown. Keep in mind that topical and other nonparenteral sources of steroids can suppress adrenal function if prolonged and/or of sufficiently high dosage. Also, the likelihood of clinically significant adrenal suppression varies with the individual, and no reliable "cookbook" formula (e.g., rule of twos) exists to help the clinician. Adrenal crisis in the dental setting is extremely rare and steroid supplementation is often given because it is easy, inexpensive, and nonthreatening to the patient, in comparison with the potential outcome from an adrenal crisis.

Preoperative Note

Introduction

The preoperative note is a summary of the patient's general status and laboratory results. It is entered in the progress notes the night before surgery. Abnormal laboratory values should be assessed and orders and notes revised accordingly. Some hospitals combine the preoperative and admission notes in day-surgery cases.

Preoperative Orders

Definition

The preoperative orders are written the night before surgery to prepare the patient for surgery (Box 1.5).

Elements

Different institutions have different policies. Be familiar with your own.

Box 1.5. Elements of Preoperative Notes and Orders

- NPO status (see Box 1.6)
- Radiographs to be taken if not already done
- Steroids/antibiotics on call to operating room
- Blood sample to blood bank: Type and hold or type and crossmatch and number of units if need for blood products is anticipated
- Medical consults
- Consent if not already taken
- Medication:
  - Sleeping pill, if necessary
  - Analgesics, if necessary
  - Premedication: Depending on the hospital, the house officer might write these or they might be per the anesthesiologist

Box 1.6. Preoperative Fasting Schedule

Age	Solid, nonclear liquids, infant formula, nonhuman milk	Breast milk	Clear liquids
Children older than 36 months and adults	6–8 hours	4 hours	2 hours
Children age 6–36 months	6–8 hours	4 hours	2 hours
Children less than 6 months	4–6 hours	4 hours	2 hours

Intraoperative Considerations

Positioning the Patient

1. The patient should be placed in the reverse Trendelenburg position with the head elevated 10° to 20° to prevent pooling of blood in the face (Appendix 21).
2. Eye protection should be provided by the placement of ophthalmic ointment, taping the eyelids closed or using ocular occluders, and placement of gauze eye pads.
3. The endotracheal tube is secured using tape so that the head can be turned from side to side without extubation. A simple technique, if the patient is nasally intubated, involves taping the tube to the skin of the bridge of the nose and forehead with silk or cloth tape (benzoin application can improve adherence) and placing a folded pillowcase turban around the head and securing the tube over the top of the head. Nasal intubation is generally preferred for most

intraoral procedures and is desirable if the patient needs to have bite-wing X-rays taken or the occlusion checked or if maxillomandibular fixation is required during the procedure. Nasal intubation is contraindicated if the patient has epidermolysis bullosa, severe coagulopathy, nasopharyngeal carcinoma, or nasal obstruction.

4. The height of the operating table is adjusted so that the operating field is at elbow level. A count is made of sponges, sharps, etc., at the beginning of every surgical procedure.
5. The patient's arms should be tucked along his or her side so that they do not dangle over the side of the table. Foam padding should be placed under the arms and feet to prevent pressure injury. A "donut" or headring can be placed under the head to minimize movement.

Prepping and Draping

Surgical Preparatory Scrub Solutions

- Iodine-containing compounds: check for allergy first
- Chlorhexidine
- Alcohol

Technique of Mucosal and Skin Preparation

1. Suction the oropharynx.
2. Place a moistened throat pack (with radiopaque marker) into the oropharynx by layering.
3. Some clinicians brush the teeth and bathe the oral tissues with iodine or other antibacterial compound (this is optional, depending on the procedure).
4. Cleanse the face by applying prep solution in an expanding circular, nonoverlapping fashion at least three times, each time with a different sponge. When applying the scrub solution, take care not to pass the same sponge over the area more than once. Be careful when applying surgical prep solutions around the eyes. Only dilute iodine compounds are tolerated by the ocular tissues.

Draping for Orofacial Surgical Procedures

Place sterile towels or paper drapes around the operating field. Then use a larger sterile drape to cover the entire patient except for the operative field. A thyroid drape is usually ideal for intraoral procedures or those involving a segment of the face. Other styles of sterile drapes can be useful depending on the amount of surface area needed in the operating field.

Use of Local Anesthetic

Consider discussion in situations when there might be a contraindication (e.g., epinephrine and severe aortic stenosis).

Type To provide the most profound anesthesia and minimize the amount of endogenous catecholamine released, use a regional block when possible, using a long-duration local anesthetic with vasoconstrictor. When proper aspiration is performed, there are few contraindications to local anesthetics containing a vasoconstrictor. In the past, epinephrine-free solutions have been recommended for use when treating "cardiac" patients. However, without epinephrine, the level of anesthesia is inadequate. The resultant pain response stimulates endogenous secretion of norepinephrine, which could have the same cardiac effects as a local anesthetic with vasoconstrictor. Therefore, short-acting local anesthetic agents without vasoconstrictor should be avoided except in cases where there is a clear contraindication, such as left ventricular outflow obstruction (e.g., hypertrophic subaortic stenosis, aortic valve stenosis). If using local anesthetic for pain control, with or without IV sedation, choose a local anesthetic agent that will provide profound anesthesia well into the postoperative period.

Profound local anesthesia will reduce the amount of general anesthetic agent needed. Consider giving additional regional blocks prior to emergence from general anesthesia to decrease postoperative discomfort.

Local anesthetic with vasoconstrictor is frequently infiltrated in the surgical site, principally to control bleeding. Exercise caution in very young or intellectually impaired patients, who might inadvertently self-mutilate soft tissues during the recovery period. The use of approved injectable form of phentolamine mesylate for the reversal of anesthesia of the lip and tongue and associated functional deficits may be considered if self-mutilation is a concern.

Quantity The maximum dose of lidocaine to limit systemic toxicity is 4.4 mg/kg, but is elevated to 7 mg/kg if epinephrine is used. The dysrhythmic threshold for submucosal epinephrine is different depending on which inhalational agent is being used: 2 mcg/kg for halothane; 6 mcg/kg for desflurane, isoflurane, and sevoflurane; and 18 mcg/kg for ethrane. Halothane and ethrane are now rarely used due to the introduction of these newer agents. Always aspirate prior to injection to avoid a large intravascular dose of local anesthetic and/or vasoconstrictor. Notify the anesthesiologist of the dose and the percentage of epinephrine prior to injection.

Block vs. Infiltration If vasoconstrictor is used, the area of the surgical procedure could be infiltrated to decrease bleeding. If the local anesthetic is given for analgesia, a regional block might be more desirable.

Sequence of Surgical Procedures

The sequence in which procedures are performed depends on the particular case. With the advent of antibiotic usage, rigid internal fixation, and other technical improvements, many of the old sequencing rules no longer apply. However, it is important that the presurgical preparation includes not only the types of procedures to be performed, but also an order in which they will be done. Every case must be treated individually.

Operative Notes

Introduction

Operative notes are a detailed summary of the surgery, preferably dictated or written immediately postoperatively before leaving the operating room (OR) suite (Box 1.7).

Box 1.7. Elements of Operative Notes

Patient data: Doctor (first and last names) dictating an operative report on (patient's name, hospital number). Patient's hospital location, service performing the surgery, and date of operation should be included
Preoperative diagnosis
Postoperative diagnosis
Operation performed
Surgeon(s) and assistant(s)
Anesthesia: For example, "Inhalation anesthesia with nasotracheal intubation"
Indications for operation: a succinct history of present illness. For the healthy child, give behavior history
Description of procedure:

- introduction of anesthesia: smooth, stormy, tube in place
- Prepping and draping of surgical site
- Type of incision, steps in incision
- Tissue removed: Description of tissue
- Pathology report (if any): Disposition of any tissue removed (e.g., "teeth sent to pathology for gross only" or "tissue sent for preparation and histologic examination")
- Irrigation solutions
- Closure: Steps and specific material used
- Packs, drains, tubes, and dressing placed (including throat pack)
- IV fluids
- Intraoperative medications, other than those used by the anesthesiologist (e.g., antibiotics, steroids)
- Surgery: When the procedures done include operative dentistry, a description of procedures should include condition of the teeth and oral cavity. All procedures should be noted (e.g., examination, scaling, four periapical radiographs). Restorations should be described by tooth restored and material used (e.g., teeth number 3, 12, and 18 were restored using occlusal amalgams over $CaOH_2$ liner). Some hospitals permit the use of universal numbering systems in medical records, whereas others require use of the full name of the tooth (e.g., "tooth number 3" vs. "maxillary right permanent first molar")

Blood: Estimated blood loss (EBL) and hematosis at completion of surgery
Fluid replacement
Complications
Status on arrival in the recovery room: State of consciousness, with or without respiratory assistance, intubated or extubated in operating room, etc.

Brief Operative Note

Definition

The brief operative note is a short note written in the medical records immediately following surgery (Box 1.8).

Box 1.8. Elements of a Brief Operative Note

- Preoperative diagnosis
- Postoperative diagnosis
- Operation performed
- Surgeon
- Anesthesia
- Estimated blood loss
- Fluid replacement
- Complications
- Condition

Postoperative Orders

Definition

Following surgery, all previous orders are considered cancelled. Hence, postoperative orders, such as admitting orders, must consider all aspects of patient care and comfort (Box 1.9).

Box 1.9. Elements of Postoperative Orders/Requests

Disposition: Admit to (location) via recovery room
Diagnosis
Procedure
Condition
Allergies
Patient monitoring: Indicated frequency of checking of the vital signs by the attendant nursing staff. The usual routine is every 15 minutes for the first postoperative hour, then every half hour until fully awake from anesthesia, followed by every hour for 4 hours and then per routine, if the patient's condition is stable
Diet: Postoperative—clear liquids to full liquids as tolerated
Activity: Ambulation as soon as possible following surgery is helpful in clearing secretions from the bronchial tree. It also helps to prevent thrombophlebitis. Toward this latter end, the use of elastic stockings is a routine postoperative procedure in some hospitals. The level of supervision should be specified, especially for children and patients who are intellectually impaired

(Continued)

Physiotherapy: Until the patient is ambulatory, turning, deep breathing, and coughing (unless contraindicated) are helpful in clearing the bronchial tree of secretions
Respiratory assistance: Consider respiratory assistance in the immediate postoperative period when respiratory efforts are still depressed secondary to anesthesia and for pain. If an inhalation anesthetic was employed, and the patient is still expiring the gases, supplemental oxygen is probably necessary and can be requested as 40% O_2 via facemask or tracheal collar to prevent hypoxia. Depending upon the patient's respiratory status, an incentive spirometer can be requested
Daily weights
Input and output
Voiding: The patient with adequate fluid intake, either PO or IV, and adequate renal function can be expected to void within six to eight postoperatively. If a catheter was placed, a flow of 30 to 60 mL/hour is adequate. The house officer should request notification if the patient fails to void or if the rate is significantly decreased
Tubes, catheters, drains, packs: Type, location, number, and care should be specified
Bedside equipment: Ice, Vaseline®, suction, wire cutters, or tracheostomy set
Monitors
IV fluids: For example, "Continue type of solution at 75 mL/hour until patient is taking fluids PO, then DC"
Medications: Preoperative medications are resumed when appropriate. Adequate analgesia is important in the postoperative period; too little can result in hyperventilation secondary to splinting, and too much can depress respiration at the central nervous system level. Antibiotics, antiemetics, and antipyretics can be added. Avoid the tendency to undermedicate children, who tend to be more pain sensitive than adults
Unusual conditions: Notify the house officer (e.g., blood pressure above 150/100 mmHg or below 90/60 mmHg, temperature above 101°F (38.5°C), pulse below 60 or above 120 bpm, oral bleeding, protracted nausea and vomiting)

Elements

The elements of postoperative orders are essentially the same format as for admission orders.

Antibiotics

Infected Wounds

Surgical principles for the removal of the etiologic agent and adequate drainage are of foremost importance. All infected wounds should be Gram stained and cultured for aerobes and anaerobes, and antibiotic sensitivities should be determined. However, the culture and sensitivity results usually take days and these infections must be treated empirically until precise information is available from the microbiology laboratory. Modification of antibiotic dosages according to body weight

(g/kilogram) is required for children. Modification of antibiotic dosages also may be required in the setting of decreased creatinine clearance.

Penicillin The drug of choice for most infected wounds in the oral cavity in adults is penicillin VK which covers Gram-positive aerobes and anaerobes (Appendix 12, Table A12-4). Bacterial resistance due to production of beta-lactamase is increasing. If this is a concern, IV or intramuscular (IM) Unasyn® (ampicillin sodium/sulbactum sodium) may be prescribed.

Metronidazole Metronidazole can be added to the therapeutic regimen to provide more anaerobic coverage and wound penetrance (Appendix 12, Table A12-4). Caution the patient against consuming ethanol when taking this medication because this can cause severe nausea and vomiting and profound hypotension.

Cephalexin The low risk notwithstanding, it is safest to avoid cephalosporins in pen-allergic patients unless absolutely necessary.

Erythromycin Erythromycin can be used in penicillin-allergic patients. It provides similar coverage to penicillin (Appendix 12, Table A12-4). When given IV, erythromycin can cause burning at the IV site and phlebitis. Common side effects include abdominal pain, nausea, and diarrhea. Erythromycin also has a number of drug interactions that should be considered prior to its use.

Clindamycin Clindamycin is a broad-spectrum antibiotic that can be used in penicillin-allergic patients (Appendix 12, Table A12-4). It is also useful for infections containing penicillin-resistant organisms. Clindamycin has been implicated in the development of *Clostridium difficile* infection although alternative antibiotics also have been shown to cause this problem. *C. difficile* infection can manifest with symptoms ranging from fever, abdominal pain, and bloody diarrhea to frank pseudomembranous colitis. Often there is a concomitant leukocytosis. If a patient develops any symptoms suspicious of *C. difficile* infection, it is important to test for the toxin and begin empiric therapy with oral metronidazole. Oral vancomycin is also used in complicated cases.

Non-Infected Wounds

Prophylactic antibiotic coverage should be continued intraoperatively and postoperatively until the IV line is discontinued. Continuation of antibiotic therapy might be indicated via the PO route if the patient has a grossly contaminated wound, an unusually extensive operation, placement of a bone graft, or a compromised immune status. PO antibiotics are administered to endocarditis susceptible patients according to the AHA guidelines (Appendix 23, Table A23-1).

Fluid management

The management of fluids is outlined in Appendix 15 (Boxes 1.10 and 1.11).

Box 1.10. Physical Assessment of Fluid Balance

Mental status: Confusion, dementia
Vital signs: Temperature, pulse, respiratory rate, blood pressure (sitting, lying)
Cardiovascular: Jugular venous distention, heart sounds
Lungs: Clear or congested
Skin: Turgor

Box 1.11. Laboratory Tests

Electrolytes
Hemoglobin/hematocrit
Urinalysis: Specific gravity

Types of Intravenous Fluid

The different types of intravenous fluid are outlined in Appendix 15, Table A15-2.

Potassium

Abnormal levels of serum potassium can have an adverse effect on cardiac muscle function.

Hyperkalemia

Hyperkalemia is a potentially life-threatening metabolic abnormality. Clinical signs include confusion, weakness, and hyperreflexia. Electrocardigram (ECG) changes include peaked T waves, decreased R waves, and a prolonged QRS complex. It is commonly treated with calcium chloride 1 g IV, followed by 25 g dextrose 50% in water IV, 5 to 10 units regular insulin IV, and by sodium polystyrene sulfonate (oral or enema). Sodium bicarbonate 1 mEq/kg IV also may be given.

Hypokalemia

Hypokalemia is more commonly encountered than hyperkalemia. Clinical signs include weakness, anorexia, and nausea. When appropriate, repletion should generally be performed by slow administration IV or PO.

Acid–Base Balance

See above. Conditions that affect the acid–base balance are outlined in Appendix 2.

Water Intoxication

Water intoxication is usually of iatrogenic origin as a result of fluid overloading in the perioperative period. Clinical signs include polyuria, soft tissue edema, pulmonary edema, confusion, and seizures associated with hyponatremia. It is treated by

water restriction with or without diuretic administration. Hypertonic saline solutions generally should not be given because rapid administration can lead to central pontine demyelination.

Syndrome of Inappropriate Antidiuretic Hormone Secretion (SIADH)

In SIADH, usually following head trauma, excess water is retained. The clinical signs are similar to those of water intoxication. This problem is treated by water restriction and administration of normal saline. If hyponatremia persists without volume excess, hypertonic saline can be administered slowly and carefully.

Diet

Patients and their families should be made aware of dietary alterations that might be experienced as a result of the surgical procedure (Appendix 11). The importance of maintaining adequate dietary intake for normal recovery should be stressed. Minimum daily requirements during convalescence include 160 g of protein and 3,000 non-protein calories. The patient also should be encouraged to drink 3 L of fluid/day. Dietary supplements are often helpful in providing adequate nutrition during the immediate postoperative period.

Although maxillomandibular fixation is rarely necessary since the advent of rigid internal fixation, some patients undergoing orthognathic surgery or treatment of facial fractures will have their teeth wired together. These patients are at particular risk for nutritional disturbance. Use of a blender to puree food will allow for ingestion of a broader variety.

Pain Management

Postoperative pain management can begin before leaving the operating room by giving small amounts of IV morphine, giving 30 mg ketorolac tromethamine IV, and by administering regional/local anesthetic nerve blocks with bupivacaine. Postoperative pain can be managed according to hospital policy because there may be regional and hospital-specific variations. Commonly a combination of basal nonsteriodal anti-inflammatory drugs (NSAID) and opiate therapy is used with short-acting opiate dosing for breakthrough pain (Appendix 12, Table A12-4). Patients should be encouraged to abandon IV or IM medications for PO pain management as soon as possible. In small children, intra- or postoperative morphine can delay discharge.

Control of Edema

Nonpharmacologic techniques for control of edema include:

- Elevation of the head
- Head dressings
- Ice packs (for a maximum of 12 hours).

Pharmacologic methods rely on the corticosteroid dexamethasone: 10 mg PO (at least one hour prior to surgery) or 4 to 12 mg IV before the procedure. However, corticosteroids should not be used in patients with chronic infections, peptic ulcer disease, renal insufficiency, gastritis, severe cardiovascular disease, or diabetes.

Management of Perioperative Complications

Nausea and Vomiting

Anesthetic agents and swallowing blood can precipitate nausea. Nasogastric suction immediately before the patient emerges from general anesthesia can be beneficial if considerable ingestion of blood is suspected. Antiemetic medications also can be used (Appendix 12, Table A12-4).

Fever

If the temperature is below 100°F (38.5°C), the patient can be treated empirically with acetaminophen (Tylenol®) 1 g PO or PR and fluid, deep breathing, and ambulation.

If the temperature is above 100°F (38.5°C), treat as above and consider using chest physical therapy (PT) and incentive spirometry if atelectasis is a possible cause.

Workup of Fever

1. Inspect wounds, IV sites, and skin for inflammation, purulent drainage, abscess, or rash.
2. Perform pulmonary auscultation for diminished lung sounds or rales.
3. Use chest radiograph to rule out atelectasis, pneumonia, aspiration, or pulmonary edema.
4. Perform urinalysis and urine culture.
5. Perform blood cultures for recurrent or persistent high-grade fever.

Hypertension

The causes and treatment of post-operative hypertension are discussed in Chapter 6.

Airway Compromise/Decreased Oxygenation

Upper airway obstruction should be treated with a nasal decongestant, for example xylometazoline (Afrin®). If severe, obstruction of the nasopharyngeal airway might require reintubation or tracheostomy (if unable to reintubate). Decreased oxygenation also can be caused by:

- Atelectasis
- Aspiration pneumonitis
- Pulmonary edema
- Pulmonary embolism

- Pneumothorax
- Asthma or bronchospasm
- Mucus plugging

Oliguria

Oliguria is a decreased output of urine and may be a sign of dehydration, renal failure, hypovolemic shock, hyperosmolar hyperglycemic nonketotic syndrome, multiple organ dysfunction syndrome, urinary obstruction/urinary retention, and urinary tract infections. Assistance should be given to any patient who has been unable to void within 12 hours of surgery. In the postoperative, postgeneral anesthetic period the nonretention causes mentioned above should first be ruled out. Symptoms are suprapubic fullness and the urge to urinate.

Treatment of urinary retention subsequent to an anesthetic is by:

- Assisted ambulation
- Heat packs to the suprapubic region
- Straight catheterization

As mentioned above, a urinalysis should be performed to rule out other causes. Volume depletion, urinary tract infection, and renal failure are also potential causes of oligouria and should be considered in the patient whose bladder is empty when catheterized. Renal ultrasound, urinalysis, urine electrolytes, and serum creatinine can be used to evaluate the underlying cause(s).

The Postoperative Note

Definition

The postoperative note is a short note discussing the status of the patient the evening of surgery (Box 1.12). It is usually in a "SOAP" format: subjective, objective, assessment and plan.

Box 1.12. Elements of Postoperatve Notes

Subjective: Patient report of status (e.g., pain, swelling, limited movement, drainage, bleeding, etc.)
Objective:

- Vital signs
- Neurologic status: Awake, alert
- Wound condition: Draining, oozing, dry
- Respiratory status: Auscultation results
- Input/output: e.g., diet, vomiting, voiding

Assessment
Plans

Follow-Up Notes

Definition

Follow-up notes are brief comments concerning patient status and plans for treatment (Box 1.13).

Box 1.13. Elements of Follow-Up Notes

Subjective: Patient report of status (e.g., pain, swelling, limited movement, drainage, bleeding, etc.)
Objective:

- Vital signs
- Neurologic status: Awake, alert
- Wound condition: Draining, oozing, dry
- Respiratory status: Auscultation results
- Input/output: e.g., diet, vomiting, voiding

Assessment/Plan/Suggestions: Continuation or change in treatment (e.g., diet, rinses, medications, exercises, etc.)

Discharge Notes and Requests

A sample of a discharge note appears in Box 1.14.

Box 1.14. Discharge Notes and Requests

Discharge diagnosis: All diagnoses should be noted
Operation or procedure
Condition
Medications: Prescriptions for antibiotics and analgesics should be included
Discharge time
Home care instructions
Follow-up appointment: Time, place, telephone number

Discharge Summary

Introduction

As well as writing an order in the chart that the patient is to be discharged, a discharge summary must be dictated (Box 1.15). If this is a day surgery case there is no need for a discharge summary.

Box 1.15. Elements of a Discharge Summary

Patient data:

- Name
- Medical record number
- Service/procedure/operation
- Date of admission
- Date of discharge
- Attending physician/dentist

History:

- Patient's age
- Number of admissions to this hospital
- Symptoms and past treatment, if any
- Pertinent past medical history
- Pertinent review of systems
- Pertinent family history
- Allergies

Past medical history: Anything that has not already been covered
Physical examination: Positive findings only
Laboratory data: Positive findings only
Hospital course: Positive findings only
Discharge diagnosis
Operations or procedures performed
Complications
Medications on discharge: Dosage should be included
Condition on discharge
Disposition: Follow-up care should be noted
Estimated disability

Clinical Course

There might be a clinical course summary to be completed and placed in the chart prior to discharge. This is a fill-in-the-blank, very abbreviated discharge summary that, among other items, lists the person responsible for dictating the more detailed discharge summary.

Examples of Hospital Charts

The hospital charts in Appendix 19, Table A19-1, show how to record the history and physical examination; orders; consult requests; and progress, operative, and discharge notes. The correct required paperwork, forms, elements of the medical record, and orders will vary from one hospital to another. Short-stay or same-day admissions (day surgery) are increasing, especially for elective surgery, and hospitals often abbreviate chart entries to allow for the short duration of the stay. Admission and preoperative notes are sometimes combined, as are admission and preoperative

orders. A discharge note might suffice instead of a discharge summary for a short hospitalization, recounting the entire hospitalization.

Examples of Emergency Room Admissions

Appendix 19, Table A19-2, gives examples of emergency room admissions.

Suggested Reading

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