

Recognition, Assessment and Safe Management of the Medically Compromised Patient in Dentistry

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A method of common risk disease recognition, physical status assessment and safe management of the medically compromised patient in dentistry is presented. This routine applies to all dentistry treatment, with special attention to pain/anxiety/stress control by any modality.

PAIN/ANXIETY/STRESS

The medically compromised patient requiring special pain/anxiety/stress control represents a greater treatment risk than average, and thus merits particular attention to preoperative physical evaluation and planning for safe management, as well as effective sedation.

Sympathetic nervous system stimulation in response to a danger (pain, anxiety, fear) results in increased heart rate and output, the fight-or-flight response, while parasympathetic stimulation results in reduced heart rate and output. In the medically compromised patient, parasympathetic dominance (acute maladaptive stress response) may result in dangerous arrhythmias and sudden death. Gregg emphasizes that uncontrolled pain/anxiety and maladaptive stress responses are the calling cards of a major medical emergency in dentistry.¹

HISTORICAL REVIEW

Historically, the dentist has been trained to function in a solo practice treating the reasonably healthy patient who can afford care.² I call this fact the Healthy/Wealthy Syn-

drome. Although we hear much talk about expansion of group practice in dentistry, the fact is that the 1988 American Dental Association (ADA) national survey demonstrated that 70 percent of general dentists practiced in a solo fashion in 1987.³

While the concept of targeting the healthy affluent patient has changed to a degree with health insurance and some emphasis in dentistry education on treating the medically compromised patient, nevertheless restorative dentistry continues to represent, on average, more than 50 percent of the undergraduate curriculum. The 1988 ADA survey reported that the average general dentist in 1987 spent only 37 percent of his or her treatment time in restorative procedures, a five percent reduction in restorative services since the 1984 ADA survey.⁴ There is no doubt that disciplines other than restorative are growing in public need and professional attractiveness. This includes the ability to treat the medically compromised patient.

Presently dentistry patients over age 65 comprise more than 12 percent of the general population (four percent in 1900). A study in 1988 by the University of Southern California (USC) School of Gerontology and the National Institute of Aging predicts that 25 percent of the US population will be over 65 by the year 2040. This is attributed to medical science's increasing ability to prolong life, with a resultant decline in the mortality rate presently averaging two percent per year. The report predicts an average life expectancy in the year 2040 of 87 years for men and 92 years for women. This projection carries staggering implications for the delivery of dentistry treatment to the aging population, many of whom are medically compromised. Educators must face the fact that excellence in disciplines other than restorative is called for, and that the time is now.

METHOD

A method of safe management developed at the USC School of Dentistry over the past 15 years will be presented.⁵ This treatment system is explained by the acro-

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nym RAM-E, R representing recognition of common risk disease through a comprehensive yet manageable medical history, A representing assessment of treatment risk by using a basic, popular physical status classification system, and M representing safe management by using simple treatment modifications for safety. E represents medical emergency care that would be most uncommonly required when following the RAM-E principles. Further, when the dentist and staff understand the RAM-E principles, emergency care is obvious and does not require the blind memorization of past years.

Only 20 percent of US dentists are willing to treat any of the 33 million people who are significantly compromised.⁶ Most of these 33 million are composed of the moderately to severely medically compromised and require no more treatment time to manage safely than do healthy patients. All too often, however, due to deficient preparation in our present educational system, patients with severe systemic disease that is disabling are treated just like the normal healthy patient, without the slightest regard for controlling pain/anxiety/stress.

In order to provide safe comprehensive care for the medically compromised patient who cannot tolerate care designed for the healthy patient, dentists must supply knowledgeable treatment modification for safety and comfort. White-knuckle, physically and emotionally exhausting treatment cannot be tolerated by these patients. In the usual course of events, the patient in this category quickly discovers that he or she is unable to withstand the stresses of routine care designed for the normal healthy (well) patient, and then, after suffering through one or more miserable experiences, presents in the future only for pressing esthetic or emergency concerns, comprehensive elective care being abandoned.

RECOGNITION

Recognition of common risk disease is provided primarily through the routine pretreatment medical history, as well as through vital signs and physical examination (emphasis on inspection).

A comprehensive medical history is rapidly becoming a standard of care in US dentistry.⁵ For a basic, medical-risk-factor evaluation by the experienced practitioner, a short-form history similar to that published in the last ADA Accepted Dental Therapeutics (1984) is still satisfactory, in my opinion.

ASSESSMENT

Assessment of the patient's condition follows the physical status classification system of the American Society of Anesthesiologists (ASA). The ASA system is used for all

Table 1. Physical Status Classification System of the American Society of Anesthesiologists, with Dentistry Treatment Considerations

	<i>ASA Physical Status Classification</i>	<i>Dentistry Considerations</i>
I	A normal healthy patient	None (stress reduction if indicated)
II	A patient with mild to moderate systemic disease	Possible stress reduction and specific modifications as indicated
III	A patient with severe systemic disease that limits activity (is disabling) but is not incapacitating	Possible strict modifications: stress reduction, specific modifications, and medical consultation prioritized
IV	A patient with severe systemic disease that limits activity (incapacitation) and is a constant threat to life	Strict modifications; office versus hospital and therapy levels depend upon thorough evaluation; medical consultation urged
V	A moribund (dying) patient not expected to survive 24 hours with or without an operation	Treatment in the hospital is limited to life support, e.g., airway and hemorrhage management

patients before surgery or outpatient procedures requiring anesthesia. The ASA physical status class is also required when a dentistry patient is scheduled for hospital inpatient or outpatient treatment under anesthesia.

Table 1 shows the ASA class on the left, and on the right are general considerations for treatment modification in the interest of relative safety and comfort. The ASA class is simply written ASA followed by roman or arabic numerals, such as ASA III. Sometimes this is written ps (physical status) followed by roman or arabic numerals, such as ps 3.

Table 2 gives examples of ASA II classification based upon my method. One of the strengths of the ASA system is its flexibility due to the strong subjective element, thus allowing considerable individual interpretation. If the system were more detailed, complete with subtypes, it would be cumbersome to the point of being most difficult to apply. However, the flexibility can produce confusion when making a physical status choice. Therefore, I have added to the ASA system somewhat in order to assist the dentist in reaching a logical physical status class. As an example of possible confusion, the ASA system calls for personal interpretation of moderate to severe systemic disease and mentions limitation of activity to the point of incapacitation, all very subjective. In order to both simplify and standardize in a useful fashion, I have defined normal or ordinary physical activity as walking up one flight of stairs or two level blocks at a normal pace.

Table 2. Examples of ASA II Classification

Examples of ASA II Classification	
<i>Current condition of:</i>	
allergic rhinitis (hay fever)	
chronic sinusitis	
pregnancy	
<i>History of:</i>	
any drug allergy or sensitivity	
hepatitis B that is antigen-positive and without disability	
AIDS or ARC without disability	
arrested pulmonary tuberculosis without disability	
heavy smoking and chronic productive cough without disability	
bronchopulmonary disease without disability	
heart disease without disability	
chronic glomerulonephritis or pyelonephritis without disability	
controlled arterial hypertension without disability	
controlled chronic glaucoma	
Meniere's disease	
significant behavioral problems with health care (moderate to extreme pain/anxiety/stress response)	
significant attitudinal problems with health care (unusual hostility, threatening, intimidating, etcetera)	

A physical function classification system originally introduced to dentistry by me in 1965,⁷ modified from the New York Heart Association system of the time, applied only to congestive heart failure, and, while I defined "normal activity" then, I used only one distress disability element, dyspnea, for standardization of physical function. Since 1965, in order to both broaden and simplify the system, I have adopted three distress disability elements common to most medical-risk disease of significance to dentistry, i.e., the appearance of precordial pain, dyspnea, or fatigue causing cessation of normal or ordinary physical activity. By this method a patient with angina pectoris would be classified ASA II if he developed precordial pain after normal or ordinary physical activity by my definition, ASA III with disability during activity, and ASA IV if disability prevents ordinary activity or requires many rests to complete.

While the New York Heart Association functional classification and the Canadian Cardiovascular Society functional classification have increased in complexity,⁸ I have allowed my original definition of normal or ordinary physical activity to remain unchanged, and I feel that the three listed distress disability elements do an adequate job of virtual automatic ASA classification by using my modified functional reserve system.

Following the same definition of normal activity and the three disability distress elements, congestive heart failure and chronic obstructive pulmonary disease would be classified as follows: resting *after* normal activity due to the distress disability elements of dyspnea/fatigue = ASA II,

resting *during* normal activity = ASA III, distress disability preventing normal activity or occurring at rest = ASA IV.

MANAGEMENT

Modification of treatment for safety falls into three general categories: stress reduction, ischemia-based modifications, and adjuvants. Utilization of indicated treatment modifications can elevate a patient from ASA IV to III or II, and the patient may readily tolerate stressful comprehensive care with equanimity. The patient will be dismissed relaxed, emotionally and physically prepared to return for further care.

The safety-oriented treatment modification record created by me and in use at USC is seen in Figure 1. This is designed to be attached to the top of the medical history, and consists of three brief sections, with space for notations by the assistant as directed by the dentist. With experience, little time will be expended on completion of this section.

The first column consists of the date when treatment modification was advised and the specific advice for each

Figure 1. The 1988 safety-oriented treatment modification record developed at the University of Southern California.

SAFETY ORIENTED TREATMENT MODIFICATION RECORD
Write Legibly in Ink

Patient _____ ID No. _____

SR ELEMENTS ¹	Date/ Advised	Example	Date/ Comment	Date/ Comment	Date/ Comment	Date/ Comment	Date/ Comment
1. Preop Rest		3-14-89 Yes					
2. Sedative/Home		NA ³					
3. Intraop Sed		See 12					
4. Local Anes		Excellent					
5. AM Treatment		Yes					
6. Time Factor		3 hr-well tolerated					
7. Hot/Humid		NA					
8. Postop Rx(s)		Pain Rx & anti					
9. Telephone		Evening excellent					
10. Emergency Call		On Call					
IBM's²							
11. Intraop O ₂		See 12 (3 L/min)					
12. Sedation: Oral Inhalation Intravenous		O ₂ 50%/ N ₂ O 50% excellent rested					
13. Position		Semirec, comfort					
14. Rubber Dam: Tolerated/Not Warned re FB		Not tol Yes INITIALS					
ADJUVANTS							
15. Other		NA					
16. Nitro Premed		Pts, excellent					
17. Pacemaker		None					
18. Anticoagulant		Yes- warned					
19. Monitoring		Note 4 below					
20. M/M/Stress Warn		Yes- INITIALS					
Faculty 1st col Student Doctor 2nd		LEGIBLE SIGNATURE					

USE CONTINUATION RECORD FOR FURTHER ENTRIES

1) Stress Reduction Elements 2) Ischemia Based Modifications 3) Not Applicable
4) Pre, intra, or postop BP/P, ECG, monaural steth, oximeter, capnograph, etc

topic. The notation NA (not applicable) is commonly inserted, or the box could simply be lined through. The dentist's initials or signature is entered at the bottom of this column.

The next column shows examples of treatment notes. This hypothetical patient displays severe anxiety and gives a medical history of coronary artery disease, with acute myocardial infarction nine months earlier and present stable (classic) angina pectoris associated with normal/ordinary physical activity (by definition) which is promptly relieved by rest and nitroglycerin. This example column is necessary for teaching purposes, but could also be of value in training the assistant. The treatment modifications in this hypothetical case should allow repeated comprehensive care with little risk, and will allow the patient to tolerate such treatment with excellent functional reserve, completing each appointment feeling well and able to return for further care.

The remaining columns are completed by the assistant with direction from the dentist at each subsequent appointment, and are initialed or signed by the dentist.

The three sections which make up the safety-oriented treatment modification record will be reviewed.

STRESS REDUCTION ELEMENTS

Pain, anxiety, and stress commonly accompany serious morbidity or mortality in the medically compromised patient, with particular regard to cardiovascular disease (coronary artery disease, hypertension, and congestive heart failure), cerebrovascular disease (stroke), and bronchopulmonary disease with related heart disease (pulmonary emphysema and chronic bronchitis). Use of stress reduction elements (SREs) has been suggested for treating the medical-risk patient,⁵ and apply as circumstances dictate.

Most SREs are mere common sense (Fig. 3), yet the majority of patients with serious systemic disease believe themselves to be healthy,⁹ and therefore stress reduction would never occur to them.

The dentist must remind the patient to obtain proper preoperative rest or to take a sedative before leaving for the office, if indicated. Intraoperative sedation should be used if necessary, and special effort should be made to ensure effective pain control.

It is wise to schedule the patient's appointments during morning hours, before the physical and emotional challenges of the day have been faced. Treatment duration is guided by the emotional and physical condition of the patient, who will almost invariably try to endure a miserable experience.

Cardiac stress in patients with heart disease can be excessive in hot, humid weather due to thermal regulatory demands, so the patient's environment should be air-

cooled portal to portal (from home to office experience). Prescriptions should be offered as indicated.

Telephoning the medical-risk patient postoperatively provides strong emotional support, and endears the patient to the caring dentist. When a medical-risk patient calls after hours for reassurance or instructions, personal attention is needed. A substitute doctor on call who does not know the patient or the treatment circumstances is of limited value.

All SREs will not apply to every medical-risk patient. Sound judgment will determine logical applications in the interest of safety.

ISCHEMIA-BASED MODIFICATIONS

Oxygen hunger is a common element of ischemia-based modifications (IBMs), both generally and in reference to specific organ systems. If the oxygen deficiency is not chronic and acute, as it is in pulmonary emphysema, it may be occasional and temporary as with angina pectoris. If the deficiency is neither chronic nor acute, it could be a problem during an acute exacerbation of a disease state associated with coronary artery or cerebral artery atherosclerosis, such as acute myocardial infarction or cerebral thrombosis.

The term ischemia means lack of blood in an organ or body part, which translates to lack of oxygen. Because most disease states of significant risk in dentistry share the ischemia factor on a general or local basis, specific treatment modifications aimed at improving tissue oxygenation can be formulated. IBMs apply as clinical judgment dictates related to the specific disease.

Intraoperative oxygen delivered by nasal cannula at a flow rate of 3 L/min is helpful in treating mild to severe ischemia-based disease. Cost per patient is small, and the benefits to the patient are great. A nominal charge for inhalation therapy is customary. For the adult patient with severe chronic obstructive pulmonary disease (chronic bronchitis or pulmonary emphysema), the flow rate of intraoperative oxygen should never exceed 3 L/min. I suggest intraoperative oxygen in this fashion as a routine for every patient with mild to severe bronchopulmonary, cardiovascular, or cerebrovascular disease.

Sedation by an appropriate route is of great benefit to the medical-risk patient if anxiety or fear is significant. Nitrous oxide/oxygen, which is often used when mild to moderate sedation is indicated, supplies supplemental oxygen as well. A maximum of 50% nitrous oxide is suggested for these patients, as disorientation and excitement can be harmful; effective sedation is often accomplished with 30 percent nitrous oxide. For the patient with severe chronic obstructive pulmonary disease, oxygen delivery must not exceed 3 L/min, duration must be brief,

and administration must be managed only by an experienced practitioner.

A semireclining treatment position, with the backrest about 45° from the horizontal, is the most comfortable for patients with mild to moderate ischemia-based disease, and I suggest this as a matter of routine. The semireclining position allows sitdown team dentistry, and ensures the patient's comfort and safety, especially patients with pulmonary edema. The supine position commonly used in dentistry decreases vital capacity 10 to 15 percent, and further compromises a patient with ischemia-based disease. Patients in the supine position also have difficulty clearing bronchial secretions during treatment. The sitting position is indicated for the patient with severe ischemia-based disease (backrest 10° from the vertical). Sitdown dentistry for patients in this position is possible, but awkward. However, since this position would only be indicated for the ASA class IV patient, treatment time would be relatively brief.

A rubber dam may be tolerated well by the patient with mild to moderate ischemia-based disease, particularly if other modifications are followed such as intraoperative oxygen and a semireclining treatment position. A rubber dam may be contraindicated in a patient with severe ischemia-based disease, or possibly a half-dam will be tolerated. If a dam cannot be tolerated, the patient should be warned about the danger of swallowing or aspirating a foreign body, and a note to this effect should be placed in the record (informed consent).

In addition to the IBMs listed on the safety-oriented treatment modification record, it is suggested that anticholinergic drugs such as atropine and scopolamine not be administered to any patient with moderate to advanced ischemia-based disease, especially diseases characterized by pulmonary edema. Anticholinergics increase pulmonary dead space and dry tracheobronchial secretions needed to assist ciliary clearance, thus increasing the risk of postoperative acute bronchitis or bronchopneumonia.

Caution is also indicated in treating the patient with a recent significant life change such as serious illness, loss of a job, bankruptcy, serious marital concerns, or death or divorce of a spouse. For such patients the risk of morbidity or mortality is increased related to congestive heart failure, arterial hypertension, and coronary artery disease. I would suggest delaying treatment if possible until a recovery has been made.

ADJUVANTS

The third section of the safety-oriented treatment modification record, adjuvants, begins with a topic "Other" for other concerns, such as drug allergy or the need for antibiotic prophylaxis.

Nitroglycerin premedication could be classified as an IBM, but is listed separately under the adjuvant section because it applies only to a history of angina pectoris within the past six months. Use of nitroglycerin is urged as it significantly increases tolerance for exercise when taken prophylactically, improves performance of exercise of patients with coronary artery disease, and decreases the frequency of potentially fatal arrhythmias. The tablet is placed sublingually (oral nitroglycerin spray may be substituted) about 5 minutes before local anesthesia is administered. Duration of action averages 30 to 60 minutes, the onset of action averaging 2 to 3 minutes. Effective prophylaxis is thus provided during the initial stress of treatment while the patient settles down to a basal state.

A pacemaker is listed in the adjuvant section so that the dentist may note special precautions regarding the use of electrocoagulation or surgery.

An anticoagulant may merit special attention, or at least a warning about the possibility of increased postoperative bleeding.

Monitoring is listed because of its increasing use in treatment of the medical-risk patient. Intraoperative electrocardiographic (ECG) monitoring is helpful in treatment of patients with a history of arrhythmia or as an added measure of safety. Patients readily accept automatic vital sign monitoring, as with the ECG or automatic blood pressure/pulse rate instruments. Such monitoring is reassuring to the anxious/fearful patient.

The last topic, "M/M/Stress Warn", is not a treatment modification, but a reminder to the practitioner that in this litigious world a preoperative warning of serious morbidity or mortality is in order for the high-risk patient (ASA physical status class IV). A preoperative warning is required of all complications that are not remote and generally considered to be remote. While one could argue that possible death under carefully controlled conditions is remote, it is wise to issue the warning in a kind, nonthreatening manner so that there is no question regarding your duty to supply informed consent.

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