Smoking interventions delivered by pediatric dentists: special recommendations for pediatric cancer patients

Vida L. Tyc, PhD Kenneth P. Hopkins, DDS, MS

Dr. Tyc is with the Divisions of Behavioral Medicine, St. Jude Children's Research Hospital and the Department of Pediatrics, University of Tennessee College of Medicine, Memphis, Tennessee; and Dr. Hopkins is the director, Dentistry Division, Department of Surgery, St. Jude Children's Research Hospital and is with the Department of Pediatric Dentistry, University of Tennessee College of Dentistry, Memphis, Tennessee.

Abstract

Child and adolescent cancer patients who use tobacco present challenging management problems for the pediatric dentist. An approach to counseling patients about their oral health risks secondary to their cancer treatment, which can be adversely impacted by tobacco use, is discussed. Strategies for conducting dental examinations with pediatric cancer patients with attention to potential tobacco-related complications are also provided. (Pediatr Dent 22:43-48, 2000)

Currently, more than three million adolescents smoke cigarettes, including 100,000 children under the age of 13 and one-third of high-school-aged students.[1] More than 3,000 teenagers become regular smokers each day. Most smokers begin smoking in their early teens, with the mean age of first use reported to be 14.6 years.[1] Among adolescents, defined in this manuscript as ages 13-18 years (children are defined as those less than 13 years of age), the prevalence of cigarette smoking and the use of smokeless tobacco (ST) increases with increasing age or grade in school.[1,2] Based on data from the Monitoring the Future Study, funded by the National Institute on Drug Abuse,[2] well over half of a nationally representative sample of tenth graders (56%) and twelfth graders (62%) and just under half of eighth graders reported having tried cigarettes (45%). A very substantial number of eighth graders were smoking one or more cigarettes on a daily basis in 1993 (8%) and many more tenth graders (14%) and twelfth graders (19%) were smoking daily. As many as 4% of eighth graders, 7% of tenth graders, and 11% of twelfth graders were smoking a half-pack of cigarettes or more daily. Current use of ST, defined as use in the past 30 days, was reported to be 11%, 10%, and 7% among twelfth, tenth, and eighth graders, respectively. These reported trends in the prevalence of adolescent smoking are alarming in that tobacco use in adolescence is strongly associated with regular tobacco use and addiction in adulthood.[1]

One might assume that patients who have been treated for cancer would abstain from tobacco use, especially if their health care provider provided appropriate counseling against tobacco use during their time spent in treatment. Yet, the smoking habits of childhood and adolescent cancer survivors have been found to resemble those of their healthy peers, despite the fact that the adverse consequences of engaging in this unhealthy behavior are magnified among survivors secondary to their treatment exposures. In fact, the results from several studies have indicated the prevalence rate of cigarette smoking in survivors to be comparable to age- and gender-specific figures in the general population as well as sibling controls.[3,4,5]

Haupt & colleagues[6] conducted the largest retrospective study to date that compared the smoking habits of 1,289 child and adolescent cancer survivors to the smoking habits of 1,930 of their sibling controls. Only small to moderate differences in self-reported smoking habits between survivors and their siblings were observed, while controlling for the influence of family factors. Survivors were reported to be 8% less likely than controls to be current smokers, 13% less likely to be ever-smokers, but 12% less likely to have quit smoking. More recently, telephone surveys were used to survey the smoking behavior of 592 young adult survivors, treated before age 20 years on the Children's Cancer Group Acute Lymphocytic Leukemia (ALL) protocols and 409 sibling controls. Results indicated that survivors were less likely to have ever smoked (23% vs. 36%) and were less likely to be current smokers (14% vs. 20%) than sibling controls.[7] Survivors were also less likely to quit smoking than sibling controls (27% vs. 35%), although this result was not statistically significant. These findings suggest that young adult survivors of childhood are less likely to experiment with smoking, but once having started, are at similar risk for becoming habitual, persistent smokers as sibling controls.

Acute and chronic oral complications of cancer treatment influenced by tobacco use

Oral complications commonly result from treatment of pediatric cancer as it applies to any primary diagnosis of malignancy and patients may be more susceptible to oral health risks if they smoke. Patients treated for cancer may experience a number of oral mucosal changes secondary to their chemotherapy and radiation treatments.[8] The patient who smokes during cancer therapy; however, is at even greater risk for developing oral mucositis.[9] Acute complications of tobacco use observed in adult head and neck cancer patients who smoked during their cancer radiotherapy typically include increased severity and duration of radiation mucositis.[10,11] These effects are clinically

Received December 1, 1998 Revision Accepted June 15, 1999

significant in that prolonged mucositis can adversely affect the cancer patient's nutritional status.

The long-term effects of chemotherapy and radiation treatment on dental caries prevalence and gingival disease in pediatric cancer survivors have not been consistently documented.[12,13,14] Conflicting results regarding the prevalence of dental caries and general oral health in children receiving chemotherapy have been reported.[12,13] Differences in study findings may be attributed to differences in selection of control groups, in procedures of dental care and oral hygiene, and in the outcome measures of dental health and scoring methods employed.[12] Young patients who have received radiation therapy to the oral region, however, may experience less equivocal and more long-term orodental effects which may complicate dental management. Salivary flow may be permanently reduced or absent in these patients, resulting in chronic xerostomia and a marked increase in the incidence of dental caries.[8] As a result of the loss and/or alteration of taste and oral changes associated with xerostomia, patients may transition to a softer, more cariogenic diet with frequent consumption of sweet, acidic fruit drinks. These dietary changes, combined with increased sensitivity of the teeth and subsequent difficulty with cleaning as well as the shift to a more cariogenic oral flora,[15] contribute to the development of dental caries in young cancer patients. Xerostomia may also increase the likelihood of intra-oral infections.[8] These combined oral sequelae result in an epithelium that is clearly more susceptible to chronic trauma from local irritants such as tobacco use.

Higher rates of tumor recurrence and second primary malignancies have been reported in adult patients with head and neck cancers who continue to smoke after diagnosis and treatment, compared with patients who stop smoking.[16,17] The incidence of subsequent cancers in children who have experienced a primary malignancy ranges between 8% and 12% at 20 years[18,19] and regular tobacco use may increase that risk. Although oral cancers are rarely seen in children and adolescents, continued tobacco use may lead to oral cancer as adults. Approximately 80% to 90% of adult oral squamous cell carcinoma (SCC) cases have been associated with tobacco and alcohol use, and these habits increase the risk of SCC from three to fifteen times that of the general population.[20]

Although research on the health effects of ST use is not as extensive as the research on cigarettes, there is a clear association between ST use and oral cancer as well as cancer of the esophagus, larynx, and stomach.[21,22] The US Surgeon General has warned that a continuation of current patterns of ST use among teen males will result in higher oral cancer rates several decades from now.[21] Smokeless tobacco use is also related to periodontal disease and a host of other oral health problems.[23] A patient's use of ST has been consistently related to high rates of leukoplakic lesions in the habitual site of tobacco placement and these lesions can undergo malignant transformation.[24] Tobacco use also serves to suppress the immune response by reducing the functional activity of leukocytes and macrophages in saliva,[23] which can be very detrimental to the cancer patient undergoing radiation treatment to the oral region.

Efficacy of behavioral smoking interventions

The most recent review of more than 300 empirical studies involving randomized controlled trials of smoking cessation intervention that included follow-up (although not specific to adolescents) concluded the following:

1) Standard self-help interventions do not significantly increase cessation rates,
2) Provider contact in the form of either individual or group counseling produces greater cessation rates than no treatment,
3) both the duration of treatment and number of person-to-person contacts are related to treatment efficacy.[25]

Smoking cessation interventions that include either supportive care provided by a clinician in the treatment session (e.g. encouragement and reinforcement for attempts to stop smoking), and/or general problem-solving/skills training (e.g. stress management, relapse prevention, recognition of high-risk situations and identification of skills intended to cope with high-risk situations, and provision of basic health risk information on smoking) significantly improve cessation rates (15% and 14%, respectively) over no contact controls. Other treatment components including aversive (rapid) smoking, contingency contracting, and relaxation are less effective. Our proposed dentist-delivered counseling approach builds on the success of effective behavioral components and addresses the specific needs of the pediatric cancer patient. These findings highlight the need for pediatric dentists to at minimum, provide social support, as well as brief educational and behavioral counseling about strategies to promote tobacco abstinence.

Dentist-delivered smoking interventions

Published studies on tobacco cessation conducted in the oral health care office have been increasing as more dental professionals are incorporating tobacco counseling as part of their routine dental care.[26,27,28] Building on the success of physician/nurse-delivered interventions in medical settings,[29,30,31] much of this work has been focused on smokeless tobacco (ST) interventions conducted with adult patients in the dental care setting. Evidence from these smoking cessation studies indicates that advice from dentists and dental hygienists to stop using tobacco has been effective in reducing patient's tobacco use. A few earlier studies have demonstrated the success of dentist-administered nicotine reduction therapy (typically nicotine polacrilex, Nicorette, Lakeside Pharmaceuticals) in producing significant adult smoking cessation rates[32,33] although they have limited relevance to the adolescent population.

In one of the largest studies to date, Stevens and colleagues[34] conducted a randomized clinical trial evaluating the efficacy of a ST intervention program delivered primarily by dental hygienists to 518 adult male patients who came into HMO dental clinics for regular hygiene visits and identified themselves as ST users. Sixteen percent of patients in the cohort were adolescent males between the ages of 15 and 19 years. Patients in the usual care control group received no special attention from the dental staff and may or may not have received advice to stop using tobacco depending on the personal practice habits of the dental care provider. The intervention group received a soft tissue examination with special attention to oral lesions, advice to quit using ST, distribution of self-help materials, a short video on why and how to stop using ST, setting a quit date, and a telephone follow-up contact one week following the intervention. Follow-up assessment conducted three and 12 months after the office visit showed that a larger propor-

Table 1. Steps For Dentist-Delivered Tobacco Counseling with Pediatric Cancer Patients

Basic Steps
• Ask about tobacco use at every visit.
• Advise about tobacco-related health risks.
• Advise about effects of tobacco on oral cavity.
• Provide strong tobacco abstinence and cessation message.
• Establish signed agreement for abstinence/cessation.
• Provide self-help literature, establish quite date and discuss.
• Arrange follow-up visit or telephone contact.
Additional Steps
• Inform about acute health complications and oral health risks of tobacco use during therapy.
• Inform about chronic health complications and oral health risks of tobacco use after therapy.
• Provide personalized risk information relative to medical and dental history.
• Explain increased vulnerability relative to healthy peers.

tion of patients in the intervention group had reported abstinence from ST compared to the control group at three months (32% vs. 21%; $c^2 = 8.03$, $P<.01$) and at the 12 month office visit (34% vs. 25%; $c^2 = 5.56$, $P<.01$). Saliva samples were collected from 48% of intervention subjects and 46% of the control subjects who reported not using tobacco at the 12 month assessment. However, because of the equal proportion of subjects in both groups who agreed to provide saliva samples and the low rate of disconfirmation for those tested, the authors chose to use self-report rather than biochemical confirmation as the primary outcome measure of the study. These findings are consistent with those of previous studies[33,35] and suggest that dental professionals are at least as effective as physicians or nurses in delivering smoking interventions.

Because the majority of users of ST products are young teen males, recent research programs have focused on preventing young people from taking up the use of snuff or chew through school-based prevention programs.[36,37] Unfortunately, there has been little effort toward assisting current users in quitting their habitual ST use. Interventions similar to those delivered by dental professionals with adults have not been conducted with adolescents.

Results from a recent survey of teenage male ST users who currently or previously had oral mucosal lesions indicated that they may be receptive to professional contact informing then about the adverse consequences of tobacco use and strategies to quit.[38] In this survey of 821 eleventh and twelfth grade boys, approximately 32% of experienced ST users (defined as use of ST more than 20 times) reported the occurrence of a lesion at some time during ST use. Boys who reported lesions were significantly more likely to view ST use as very harmful to their health than those without lesions and were significantly more likely to have tried to quit at least once. After finding a lesion, many ST users modified their habits accordingly. Approximately 35% reported that they stopped using ST products at least briefly while 24% moved the tobacco to another location in their mouth and continued to use ST. It is important to note, however, that this study relied on self-reports of lesions without corroboration by clinical assessment. Saliva samples were also obtained at the time of the survey and students were told that nicotine could be detected in their saliva. The samples were not analyzed due to budget constraints, but the authors argued that respondents were likely to provide accurate reports as they thought their responses would be validated. These findings suggest that by establishing a lesion history, discovering a lesion at examination, or identifying patients at risk for lesion development, dental professionals may have the opportunity to discuss the adverse effects associated with ST use as well as quitting options with their adolescent patients.

Guidelines for tobacco counseling with adolescent cancer patients in the context of the dental examination

Because dentists are prevention-oriented and trained to diagnose oral conditions caused by tobacco, they have a unique opportunity to discuss the hazards of its use and the benefits of abstaining with their young patients.[39] Approximately 63% of the US population visits a dental clinic in any given year, including 75% of persons aged 5-17 years.[40] Patients with cancer may be seen at even more regular intervals for oral health problems secondary to their cancer treatment. For young patients with cancer, oral health care professionals can deliver powerful messages against tobacco use because of their credibility and medical expertise and often long-term relationship and regular contact with patients. During dental visits, patients are sensitized to their health and vulnerability creating a "teachable moment" that should be capitalized on by providers.[41]

The National Cancer Institute (NCI) has outlined brief tobacco use intervention methods for the dental setting that are actually quite similar to the recommendations proposed for physician-delivered programs.[42] The NCI protocol emphasizes a four step approach to tobacco counseling: 1) ask about tobacco use, 2) advise to quit, 3) assist with quitting, and 4) arrange for follow-up. These treatment components also resemble the 1996 Agency for Health Care Policy and Research (AHCPR) "Smoking Cessation Clinical Practice Guidelines." These guidelines provide detailed clinical practice recommendations based on a review of the research literature and supporting empirical evidence and apply to all clinicians involved in direct health care delivery. Although the NCI and AHCPR guidelines are not specific to children and adolescents, specific suggestions for advising children and youth are provided with precautionary statements and/or contraindications regarding the appropriateness of pharmacological smoking methods for children and adolescents under age 18.[43]

Table 2. Basic Oral Hygiene Measures for the Pediatric Cancer Patient

• Demonstrate correct tooth brushing techniques.
• Advise twice daily brushing with a medium bristle brush.
• Urge flossing once daily.
• Stress need for daily home fluoride applications if needed.
• Emphasize the need for restricting sugar intake in relation to dental caries.
Basic Dental Examination for the Pediatric Cancer Patient
• Take a panoramic radiograph for screening for effects of oncotherapy on developing teeth (e.g., stunted roots, microdontia, hypodontia).
• If patient had had head or neck radiation therapy (RT), check for any excessive mouth dryness, trismus, or cervical demineralization and/or sensitivity.
• Question patient about taste loss or changes.
• Check soft tissues for changes that could be associated with use of smokeless tobacco (e.g., shiny, wrinkled mucosa, leukoplakia, erythroplakia). If these are present, show them to the patient.
• Look for tooth staining that may be attributed to tobacco use and point out to the patient.
• Check for halitosis and determine cause.
• Monitor every six months for non-head and neck patients.
• Monitor every three to four months for patients who received RT to oral areas.

The didactic content of these guidelines also does not specifically address the needs of the young patient treated for cancer. Preliminary research with adolescent cancer patients found that they expressed a general perception that their health is vulnerable and a greater need to protect their health than what they perceived was the need for most other people their age. Patients' perceived importance of health protection was significantly related to the practice of selected health protective behaviors.[44] These findings are consistent with a Health Belief approach to health promotion which suggests that an individual's perceived vulnerability to adverse health outcomes is associated with the promotion of positive behavioral change.[45,46] Therefore, unlike traditional approaches geared to the healthy adolescent, interventions that emphasize the cancer patient's vulnerability to tobacco-related health problems as greater than their healthy peers who have never been treated for cancer, may be the most effective. Table 1 summarizes the components of a dentist-delivered smoking intervention that not only incorporates NCI recommendations but also addresses the educational needs of both young smoking and non-smoking cancer patients (See Table 1).

The dentist who provides services to the young cancer patient and his family should be certain to inform the patient of the acute complications of tobacco use during cancer therapy, as well as the late complications of tobacco use after completion of cancer therapy. Although cancer patients are generally at increased risk for numerous health problems if they use tobacco, some may be at greater risk than others depending on their diagnosis and treatment history. For example, patients diagnosed with a nasopharyngeal carcinoma and rhabdomyosarcoma who receive high-dose radiation therapy to the head and neck region may be at greater risk for developing tobacco-related diseases than the patient diagnosed with leukemia and treated with chemotherapy alone. The dental provider should relate the patient's personal health risks to his/her dental and medical history, current health status, and current oral health status. This process may require close consultation with the patient's hematologist or oncologist to identify features of the patient's treatment history that place him/her at risk for certain health problems.

Routine dental follow-ups should be carefully integrated into medical follow-up procedures for patients who have completed antineoplastic therapy. A baseline dental consultation should be requested for high risk patients in order to identify specific dental problems, to provide dental treatment to eliminate or control oral infections and hemorrhages, to register pre-dental parameters (i.e., radiographs and gingival health) and to provide counseling regarding basic hygiene measures.[12] Follow-up examinations should focus on disturbances in dental development and caries prevention, salivary function, and changes in the oral microflora.[13] Although follow-up every six months is sufficient for pediatric patients with non-head and neck malignancies, more regular follow-up during and after treatment is recommended for patients receiving radiation treatment to the oral areas.[20] The dentist or dental hygienist can demonstrate to patients how tobacco use is affecting their oral and dental structures for conditions that may be more obvious such as tooth staining, periodontal disease, nicotine stomatitis, local gingival recession, leukoplakia, or other mucosal conditions.[47] Discussion of these less threatening conditions may provide a segue to addressing later potential oral cancer risks and other less apparent general health risks that are exacerbated as a function of treatment for cancer. Specific components of a basic dental examination with consideration of the influence of tobacco use and proper oral hygiene measures for pediatric cancer patients are outlined in Table 2.

Supported by the American Lebanese Syrian Associated Charities (ALSAC) and the National Cancer Institute, Cancer Center Support (CORE) grants CA 21765 and CA 23099.

References

1. US Department of Health and Human Services: Preventing tobacco use among young people: A report of the surgeon general. Atlanta, GA. Public Health Service, Centers for Disease Control and Prevention, Office on Smoking and Health. Washington, DC, US Government Printing Office no. S/N 017-001-00491-0, 1994.
2. Johnston LD, O'Malley PM, Bachman JG. National survey results on drug use from the Monitoring the Future study, 1975-1993. Vol I. Secondary school students. Rockville, MD: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Drug Abuse, 1994. (NIH publication no. 94-3809.)

3. Cokery JC, Li FP, McDonald JA. Kids who really shouldn't smoke. N Engl J Med. 1979, 300:1279.
4. Hollen PJ, Hobbie WL. Decision making and risk behaviors of cancer-surviving adolescents and their peers. J Pediatr Oncol Nurs. 13:121-34: 1996.
5. Troyer H, Holmes GE. Cigarette smoking among childhood cancer survivors. Am J Dis Child. 142:123:1988.
6. Haupt R, Bryne J, Connelly RR, Nostow EN, Austin DF, Holmes GR, et al. Smoking habits in survivors of childhood and adolescent cancer. Med Pediatr Oncol. 20:301-6:1992.
7. Tao ML, Guo MD, Weiss R, Byrne J, Mills JL, Robison LL, et al. Smoking in adult survivors of childhood acute lymphoblastic leukemia. J Natl Cancer Inst 90:219-25:1998.
8. Fayle SA, Duggal MS, Williams SA. Oral problems and the dentist's role in the management of paediatric oncology patients. Dent Update. 19(4):152-9:1992.
9. Daeffer RJ. Protective mechanisms: Mucous membranes. In: Johnson BL, Gross J, eds. Handbook of oncology nursing. New York: John Wiley and Sons. 253-74:1985.
10. Harari PM, O'Connor NJ, Fiore MC, et al. Radiation oncologists can assist head and neck cancer patients with smoking cessation. Int J Radiat Oncol Biol Phys 1995;31:645-59.
11. Browman GP, Wong G, Hodson I, Sathya J, Russell R, McAlpine L, et al. Influence of cigarette smoking on the efficacy of radiation therapy in head and neck cancer. N Engl J Med. 328:159-163:1993.
12. Dens F, Boute P, Otten J, Vinckier F, Decleick D. Dental caries, gingival health and oral hygiene of long-term survivors of pediatric malignant diseases. Arch Dis Child. 72:129-32:1995.
13. Näsman M, Björk O, Söderhäll S, Ringdén O, Dahllöf G. Disturbances in the oral cavity in pediatric long-term survivors after different forms of antineoplastic therapy. Pediatr Dent. 16:217-23:1994.
14. National Cancer Institute Monographs. Consensus development conference on oral complications of cancer therapies: diagnosis, prevention and treatment. 9, 1990.
15. Fattore L, Rosenstein HE, Fine L. Dental rehabilitation of the patient with severe caries after radiation therapy. Special Care in Dentistry, November-December. 258-261:1986.
16. Ostroff JS, Jacobsen PB, Moadel AB, et al. Prevalence and predictors of continued tobacco use after treatment of patients with head and neck cancer. Cancer. 75:569-76:1995.
17. Schwartz LH, Ozsahin M, Nizhang G, et al. Synchronous and metachronous head and neck carcinomas. Cancer. 74:1933-1938:1994.
18. Meadows AT, Obringer AC, Marrero O, et al. Second malignant neoplasms following childhood Hodgkin's disease: Treatment and splenectomy as risk factors. Med Pediatr Oncol. 17:477:1989.
19. Neglia JP, Meadows AT, Robison LL, et al. Second malignant neoplasms after acute lymphoblastic leukemia in childhood. N Engl J Med. 325:1330-6:1991.
20. Marshall JR, Graham S, Haughey BP, Shedd D, O'Shea R, Brasure J, et al. Smoking, alcohol dentition and diet in the epidemiology of oral cancer. Eur J Cancer (Part B, Oral Oncology). 28B:9-15:1992.
21. Novello AC. Foreward. USDHHS smokeless tobacco on health: An international perspective. National Institutes of Health, National Cancer Institute. iii-vii:1993:DHS publication NIH 93-3461. NCI Smoking and Tobacco Control Monograph No.2.
22. Winn SM. Surveillance of and knowledge about cancer associated with smokeless tobacco use. Smokeless tobacco on health: An international perspective. Bethesda, Maryland: National Cancer Institute, National Institutes of Health, DHHS Publication NIH 93-3461, 1992.
23. Christen AG. The impact of tobacco use and cessation on oral and dental diseases and conditions. Am J Med. 93(1A):25-31:1992.
24. Mattson ME, Winn DM. Smokeless tobacco: association with increased cancer risk. Natl Cancer Inst Monogr. 8:13-6:1989.
25. Cinciripini PM, McClure JB. Smoking cessation: Recent developments in behavioral and pharmacologic interventions. Oncology. 12:249-65:1998.
26. Christen AG, McDonald JL, Klein JA, Guba CJ, Christen JA. How-to-do-it quit-smoking strategies for the dental office team: an eight-step program. JADA Supplement. 205:175:1990.
27. Fried JL, Rubenstein L. Attitudes and behaviors of dental hygienists concerning tobacco use. J Public Health Dent. 50:172-7:1990.
28. Gerbert B. Coates T, Zahnd E. Dentists as smoking cessation counselors. JADA. 118:29-32:1989.
29. Hollis JF, Lichtenstein E, Mount K, Vogt TM, Stevens VJ. Nurse-assisted smoking counseling in medical settings: minimizing demands on physicians. Prev Med. 20:497-507:1991.
30. Ockene JK, Adams A, Pbert L, Luippold R, Herbert JR, Quirk M, et al. The physician-delivered smoking intervention project: Factors that determine how much the physician intervenes with smokers. J Gen Intern Med. 9:379-84:1994.
31. Stainslaw AE, Wewers ME. A smoking cessation intervention with hospitalized surgical cancer patients: A pilot study. Cancer Nurs. 17:81:1994.
32. Christen AG, Young JM, Beiswanger BB, Jackson RD, Potter RH. Effects of nicotine chewing gum on complete dentures and their soft-tissue bearing areas. Int J Pros. 2:155-62:1989.
33. Cohen SJ, Stookey GK, Katz BP, Drook CA, Christen AG. Helping smokers quit: a randomized controlled trial with private practice dentists. JADA. 118:41-5:1989.
34. Stevens VJ, Severson H, Lichtenstein E, Little SJ, Leban J. Making the most of a teachable moment: a smokeless tobacco cessation intervention in the dental office. Am J Public Health. 85:231-5:1995.
35. Seeker-Walker RH, Solomon LJ, Haugh LD, Welsh D, Tatro M, Witham L. Smoking cessation advice delivered by the dental hygienist: A pilot study. Dental Hyg 1988; April, 186-92.
36. Severson HH, Glasgow R, Wirt R, Brozovsky P, Zoref L, Black C. Preventing the use of smokeless tobacco and cigarettes by teens and results of a classroom intervention. Health Res. 6:109-20:1991.
37. Severson HH, Zoref L. Prevention and early interventions for addictive behaviors: Health promotion in the schools. Interventions for achievement and behavior problems. In: Stoner G, Shinn M, Walker H, ed. Silver Spring, Maryland: National Association of School Psychologists. 539-57:1991.

38. Daughety VS, levy SM, Ferguson KJ, Pomrehn PR, Beeker SL. Surveying smokeless tobacco use, oral lesions and cessation among high school boys. JADA 125:173-80:1994.
39. Crews KM, Johnson L, Nichols M. Patient management in a tobacco-cessation program in the dental practice. Compend Contin Educ Dent;XV. 1142-55:1996.
40. Meeklenburg RE. Managing hard-core smokers: oral health team challenges and opportunities. Health Values. 18:6-16:1994.
41. Vogt TM, Lichtenstein E, Ary D, Biglar A, Danielson R, Glasgow RE, et al. Integrating tobacco intervention into a health maintenance organization: The TRACC Program. Health Educ Res. 4:125-35:1989.
42. Meeklenburg RE, Christen AF, Gerbert B, Gift TJ, Glynn RB, Jones E. How to help your patients stop using tobacco: A National Cancer Institute Manual for the Oral health Team. USDHHS, National Institutes of Health, 1990.
43. Ostrowski DJ, DeNelsky GY. Pharmacologic management of patients using smoking cessation aids. Dent Clin N Am. 40:779-801:1996.
44. Mulhern RK, Tyc VL, Phipps S, Crom D, Barclay D, Greenwald C, et al. Health-related behaviors of survivors of childhood cancer. Med Pediatr Oncol. 25:159-165:1992.
45. Clark NM, Beeker MH. Health education and health promotion in cancer prevention. Cancer epidemiology and prevention. 2nd ed. Schottenfeld D, Fraumeni JF, eds. New York: Oxford University Press. 1410-1421:1996.
46. Weinstein ND. Testing four competing theories of health-protective behavior. Health Psychol. 12:324-33:1993.
47. Stafne E. The role of the dental office in tobacco cessation: a practical approach. NW Dent, January-February. 17-21:1993.

ABSTRACT OF THE SCIENTIFIC LITERATURE

MANAGEMENT OF CHILDREN WITH ACUTE ASTHMA IN THE EMERGENCY DEPARTMENT

This review article presents a detailed discussion of childhood asthma and its emergency management. Asthma is described as the most common chronic disease of childhood in the U.S. Affecting approximately 4.8 million children (< 18 years old), it is estimated that asthma accounts for almost 900,000 children's emergency department (ER) visits annually.

Asthma is defined as a chronic inflammatory disorder of the airway, involving mast cells, eosinophils, T lymphocytes, neutrophils, and epithelial cells. Asthma can cause recurrent episodes of wheezing, breathlessness, chest fatigue, cough, airway obstruction, and bronchial hyperresponsiveness. Status asthmaticus is described as persistent obstruction to airflow that fails to improve, or worsens, despite appropriate therapy with sympathomimetics. This is a life-threatening emergency that can progress to ventilatory failure and death.

The sequence of a severe asthma episode was described: asthma is exacerbated by exposure to any of a variety of 'triggers'; which cause a release of inflammatory mediators; bronchoconstriction results from an increase in the inflammatory response and a migration of inflammatory cells into the bronchial walls; leading to a progressive airflow obstruction, atelectasis, hypoxia, and hypercarbia; respiratory system changes can have secondary effects on cardiac output.

The article presents a great deal of information regarding various aspects of patient assessment, laboratory data analysis, acute management, and therapeutic adjuncts, including mechanical ventilation. A Table lists medication options and dosages for the emergency treatment of acute asthma.

Several key issues are highlighted:

- Primary assessment is based more on patient history and physical examination rather than on more objective measures and laboratory data. Rapid assessment is critical.
- If there is significant wheezing, pulse oximetry should be utilized. An O_2 saturation of œ91% is more likely to require more intense therapy. Humidified O_2 should be administered to keep saturation levels > 90%.
- Inhaled _-adrenergic agonists (especially Albuterol) are the drugs of choice for reversal of airflow obstruction in acute exacerbations.
- Recommended Albuterol therapy is 3 treatments spaced 20-30 minutes apart. Dosages are 0.15 mg/kg; or 2.5 mg/dose in children <20 kg and 5.0 mg/dose in children > 20kg.
- If a patient is non-responsive to Albuterol, subcutaneous epinephrine is the preferred drug. If this is not effective an I.V. _-adrenergic agonist (Terbutaline in the US) is the drug-of-choice.
- Ipratropium bromide is the only anticholinergic agent approved for broncholilation.
- A combination of ipratropium bromide + corticosteroids apparently decreases the overall need for hospitalization.
- Methylxanathines (ex. theophylline) are no longer used as 'first-line therapy' for treating acute asthma.
- Only about 1% of patients will require intubation and mechanical ventilation. This is a high-risk procedure. Mortality has been reported to be as high as 17%.
- The greatest predictor of death related to asthma attack is a history of previous intubation for asthma.

Comments: It is highly recommended that the entire article be obtained for anyone desiring a succinct reference on childhood asthma, as the information is very well organized and presented. Preparation and rapid response to an acute exacerbation of asthma is critical. In-office emergency kits should include, at least, Albuterol and epinephrine, the first drugs used in response to an acute asthma attack. RFM

Address correspondence to: Faiqa Qureshi, M.D., Pediatric Emergency Medicine, Children's Hospital of The King's Daughters, 601 Children' Lane, Norfolk, VA 23507-1921; e-mail: Fqureshi@chkd.com.

Management of children with acute asthma in the emergency department. Qureshi, F. Pediatr Emerg Care 15(3): 206-214, 1999.

134 references