Dental management of leukemic patients

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Three cases involving the oral management of patients with acute leukemia are described. Of particular interest is that the patients had abnormal responses to oral disease, probably related to their compromised host defenses. Because of the difficulty in treating oral disease in leukemic persons while they are undergoing chemotherapy, it is extremely important that such patients have dental evaluations and, if possible, treatment prior to initiation of medical management for their neoplasia.

Acute leukemia is a malignant neoplastic disease that is manifested by the progressive appearance of immature, primitive blood elements that continue to proliferate. If treatment is not successful, normal hematopoietic function deteriorates rather rapidly, with subsequent development of anemia, neutropenia, and thrombocytopenia. Death is usually secondary to infection and/or hemorrhage.2

The leukemic patient often has marked elevations of white cell counts, with relatively few of the white cells functional in protecting the patient against infection.3 Therefore, the patient with leukemia, because of either his natural disease state and/or the chemotherapeutic management of that disease, is at markedly higher risk of systemic complications.2 These complications, manifested by such findings as bacteremias, fungemias, septicemias, and fever of unknown origin, can be life threatening.

The proper management of the oral cavity in a patient with acute leukemia is a newly explored field and continues to be difficult and subjective at best. A review of the medical and dental literature reveals that, in general, clinical reports of individual patients furnish the dentist and physician with the major guidelines by which treatment recommendations are developed.4–12 While we value this approach, what is needed at this time is a broad, comprehensive study of systemic complications in a large population of these types of patients, following randomized assignment of the patient into various modes of therapy (for example, home care, initial periodontal therapy, and extraction if indicated). Our department, in conjunction with the Baltimore Cancer Research Center (BCRC) in Baltimore, Maryland, is engaged in such a study and plans to report preliminary data in the near future.

Until such findings are available for aid in the management of future patients, we shall continue to rely upon clinical experiences that we and other practitioners have had with leukemic individuals. The three cases described below present several aspects of the dental management of the leukemic patient.

CASE REPORTS

CASE 1

A 26-year-old white woman (V. S.) was referred by the BCRC for dental evaluation. She described “sensitivity to sweets” in the maxillary left region of “a couple months’ duration.” All teeth were negative to hot, cold, or mastication by the patient’s description. The past medical history, including a review of systems, was noncontributory, except for acute myelocytic leukemia, diagnosed in December, 1976, and its associated chemotherapeutic treatment.

On Aug. 16, 1977, the patient was entering an early relapse, with 1,000 white blood cells (55 percent granulocytes) and 80,000 platelets. She required antibiotic prophylaxis (ampicillin, gentamicin) prior to and following any surgical procedure. The patient was taking no other medications.

Oral examination on this date revealed several amalgam restorations, most of which were within normal limits. Radiographic examination revealed primary caries on teeth No. 10, 12, 15, 30, and 31, and recurrent caries on teeth No. 4, 13, and 19. Soft tissue, including the periodontium, was within normal limits.

Between August 21 and September 3, the patient received routine dental care, including minor periodontal therapy, as well as amalgam and resin restorations. Following this dental treatment, the patient underwent chemotherapeutic management from September 6 through 12 (Daunomycin, 45 mg./M² daily for 3 days, cytosine arabinoside, 100 mg./M² daily for 7 days). The following blood values were observed:

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On September 23, the patient began to describe an intermittent, spontaneous "tingling" in the left maxillary sinus region, varying in intensity and character. This paresthesia extended from the zygomatic arch to the infraorbital region on the left side. During the next week, consultations from other medical services, including Ear, Nose, and Throat, were obtained. Leukemic involvement of the central nervous system (CNS) was considered likely from the neurologic findings. The dental consultation on September 30 revealed the following findings: no caries, intraoral and extraoral soft tissue and restorations within normal limits. No teeth responded abnormally to percussion or hot or cold testing. However, electric pulp testing of the maxillary left second premolar revealed no response at 10, the highest reading. Endodontic therapy was performed on this tooth, and the above-described neurologic symptoms in this region disappeared. No CNS leukemia was documented, and the treatment for this possible involvement was avoided.

CASE 2

A 32-year-old white woman (G. M.) was evaluated while an inpatient in the BCRC because of "soreness" in the right maxillary molar region.

The patient was admitted on Oct. 31, 1977, with a diagnosis of acute myelocytic leukemia. On admission she had 1,500 WBC (24 percent polymorphonuclear leukocytes), 14,000 platelets, and a hematocrit value of 28 percent.

On November 1, she began chemotherapy (daunorubicin, 45 mg./M^2 for 3 days, and cytosine arabinoside, 100 mg./M^2 for 7 days). She was also randomized to receive prophylactic granulocyte transfusions.

On November 3, she became febrile, with a temperature of 101.8° F. Dental examination revealed generalized moderate periodontal disease, including pocket formation (4 to 5 mm.) in the maxillary right posterior region. This area was sensitive to palpation and probing. The patient was transfused with platelets, and curettage of the periodontal lesions in this area was performed. The patient was also placed on ticarcillin and gentamicin.

The patient became afebrile the following day, and remained so for 6 days. On Nov. 10, 1977, the temperature again was slightly elevated, and remained so during the course of her admission. On Nov. 10, ticarcillin was discontinued, and clindamycin was substituted. All antibiotics were discontinued on Nov. 13, despite the fact that the patient remained febrile.

CASE 3

A 31-year-old white woman (L. B.) was admitted to the BCRC on April 17, 1978, with a diagnosis of acute nonlymphocytic leukemia. Routine dental evaluation revealed localized moderate periodontal disease in the maxillary and mandibular molar region.

On the day of admission, the patient began chemotherapy (cytosine arabinoside, 100 mg./M^2 for 7 days, and doxorubicin, 30 mg./M^2 for 3 days). On April 29, at which time she had 500 WBC, 34,000 platelets, and 30 percent hematocrit, she presented with two 0.5 by 0.5 cm. ulcerations of the left anterior pillar, petechia on the alveolar mucosa of the maxillary left first premolar, and mild "soreness" of the mandibular right posterior molar region. The patient was febrile, with a temperature of 100.8° F.

On May 1, an enlarged right submandibular node was noted and the patient's temperature was 101.0° F. On this day, local home care (toothbrushing and flossing) was reinforced. Therapy with H_2O_2 (Gly-oxide) was initiated. Ticarcillin was instituted for 5 days.

On May 4, the second course of chemotherapy was initiated. On May 5, the patient "felt better," with only mild discomfort in the mandibular right posterior region. On May 6, she was slightly febrile (99.8° F.) and had no oral complaints. She had a white blood count of 900, hematocrit of 37.8 percent, and a platelet count of 71,000.

DISCUSSION

The three patients described in this report are interesting from several aspects. First, we are finding that many leukemic patients do not usually display the classic signs and symptoms of the inflammatory process, particularly when that reaction is acute. Notably, the intense erythema usually observed in nonleukemic persons with moderate to severe acute periodontal disease is dramatically reduced or absent in these patients. Obviously, during the phases of chemotherapy in which the bone marrow is suppressed and the peripheral white blood cell counts approach 500 cells/mm^3 or less, the patient is unable to effectively mount defense mechanisms to localized dental infections. However, equally important is the fact that all of the patients described herein had some degree of periodontal disease which was asymptomatic upon initial admission to the BCRC. The treating physicians were unaware of any oral disease until our findings were reported to them, partly because the patient was not symptomatic orally.

Second, we found that in one patient (V. S.), percussion of a tooth suspected of having periapical disease associated with it led to a false-negative finding. Only vitality testing, not percussion or radiograph, led to a definitive clinical diagnosis of necrotic pulp with secondary periapical pathosis. Thus, unless careful examination of the entire oral cavity, including the periodontal structures, is performed, oral disease can be easily missed in these patients.

Third, the asymptomatic periodontal disease in two of the patients described herein (L. B. and G. M.) became acutely symptomatic during the phase of bone marrow suppressive therapy. Indeed, the involved

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areas were painful to palpation and the patients were febrile. In one case (Patient G. M.), institution of proper oral hygiene and initial periodontal debridement resulted in an afebrile state. However, 6 days following this treatment, the temperature became slightly elevated. Since the patient's medical status had not allowed definitive periodontal therapy, it is likely that the recurrence of the febrile state was due to the residual periodontal disease present. Other sources of infection were not identified by the treating physician. In the other case (Patient L. B.), we believe that the decrease in febrile state was due to improvement in oral hygiene. As in the previous case, we feel that since dental therapy was not definitive, a failure to maintain an afebrile state was not surprising.

Shepherd has recently published a survey of oral complications in leukemia. It was suggested that infection, being the most common oral complication, should be eliminated by means of "routine oral hygiene." While we agree that brushing, flossing, and perhaps local curettage, if indicated, could be useful in controlling periodontal infection in the nonleukemic person, we do not feel certain that the same recommendation for the leukemic patient is based on sound scientific study. For example, it is possible that brushing and/or flossing, particularly during the granulocytopenic stage secondary to chemotherapy, might result in increased incidence of bacteremia, fungemia, sepsisemia, and/or fever of unknown origin. We raise this issue not to challenge the recommendation of dental care for the leukemic patient but, rather, to demonstrate the need for comprehensive study of the incidence of systemic complications in these patients which are possibly related to either the oral disease, its treatment, or both. On the other hand, it is equally possible that the presence of oral disease may greatly contribute to the morbidity and mortality of the leukemic person and should be vigorously treated. The question remains unanswered.

Many clinicians, perhaps rightly so, are fearful that such relatively nontraumatic procedures as flossing and periodontal probing might contribute to the development of medical complications such as those described above. Our position is that the benefits of such diagnostic and therapeutic aids outweigh the possible risk of medical complication. Another position taken by some medical oncologists is all teeth of leukemic patients in remission should be extracted. We do not favor either extreme.

Finally, it is important to realize that all three patients described herein had fevers of unknown origin, oral complaints of pain with documented clinical oral disease, and no other identifiable source of infection. There existed with all three patients a temporal and possibly causative relationship between the oral infection and the systemic symptoms. It is quite probable, therefore, that the presence of oral disease resulted in medical complications. On the basis of these and other findings, we feel very strongly that at the time of admission for cancer therapy all patients should have a dental consultation so that appropriate decisions may be made regarding the identification, treatment, and prevention of dental disease and its complications.

**SUMMARY**

Three cases involving the dental management of leukemic patients are presented. In all three patients, oral disease that was nonsymptomatic prior to chemotherapy became symptomatic when the medical therapy was initiated. It is strongly recommended that all leukemic patients have dental consultation and, when possible, any indicated dental treatment prior to the initiation of chemotherapy.

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**REFERENCES**


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