

CHANGES IN THE ORAL ENVIRONMENT IN CANCER PATIENTS

V Cugadasan

INTRODUCTION

The great majority of head and neck tumors are seen in anatomical regions involving the upper respiratory tract and alimentary passages. In total management of these patients, we should remember that the cancer patient has enough to endure and our objective before undertaking treatment is to ensure that we can help the patient rather than make his end more miserable. Head and neck cancer necessitates a multidisciplinary approach because of the overlap of many medical, dental and surgical specialties. In this paper, an attempt is made to focus the changes in the oral environment in cancer patients and in those receiving radiation and chemotherapy.

Both forms of therapy have manifestations in the oral cavity and demand special consideration in planning of dental treatment. Attention to oral health is an extremely important part of cancer care not only in patients with cancer of head and neck but also for those on therapy programme which may cause secondary oral irritation.

ORAL ULCERATION

Mucositis leading to ulceration of oral mucosa indicates that an inflammatory reaction or lesion is present within the oral cavity (fig. 1). This is generally a local manifestation of a number of pathologic insults to mucosa. Inhibition of the basal layers of mucosa from multiplying and replacing the superficial cell layers can lead to loss of integrity of the surface. Radiotherapy delivered to oral cavity can lead to mucositis and salivary gland dysfunction. Production of saliva is affected. This will bring about changes in the natural acid base balance and changes in the oral bacterial flora.

In addition one must remember that the oral cavity is a common site of origin of malignancy, majority of them being squamous cell carcinoma (figs. 2, 3). Pain and dysphagia may follow leading to impoverished nutritional state which again contributes to inability of the oral mucosal ulcers to heal.

Department of Oral Surgery
Faculty of Dentistry
National University of Singapore
Sepoy Lines
Singapore 0316

V Cugadasan, FDSRCS (Eng)
Senior Lecturer

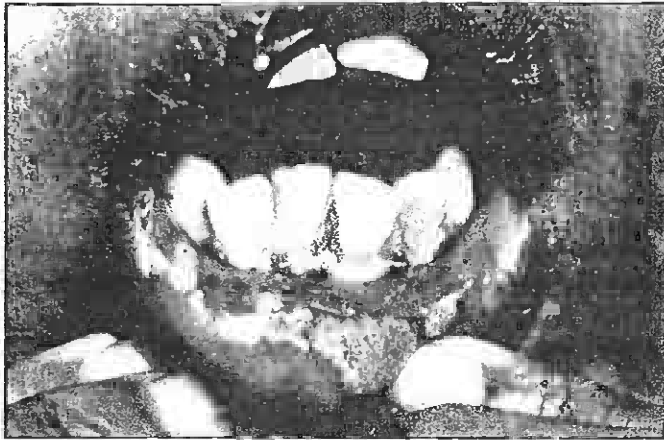


Fig. 1 Mucositis and ulceration of labial mucosa

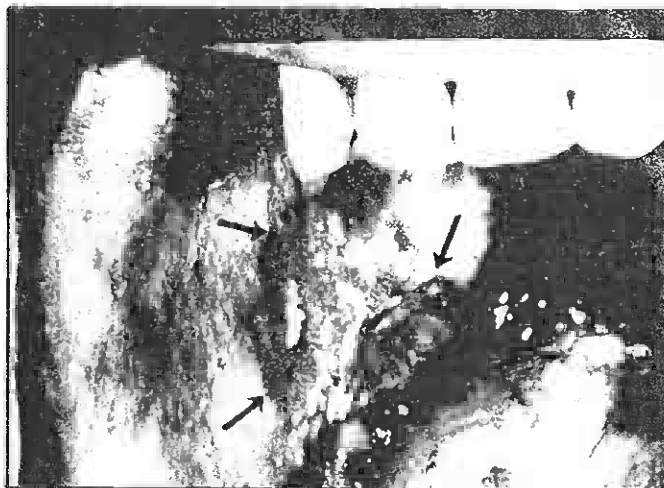


Fig. 2 Squamous cell carcinoma of oral cavity

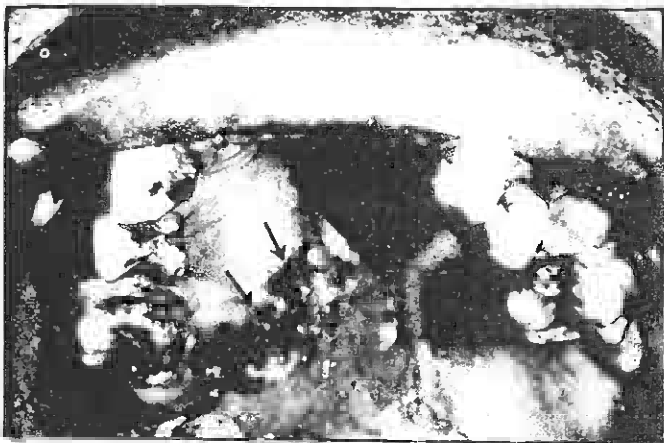


Fig. 3 Carcinoma with neglected dentition

IRRADIATION

When irradiation is employed as the only form of therapy for cancer, certain peculiar dental problems are seen in these patients (1). Dry mouth, a result of decrease in salivary secretion as much as ninety per cent in some cases can be the cause of other complications. Remaining saliva shows qualitative change in electrolyte concentration leading to a lower buffering capacity as well as a decrease in the overall amount of immunoglobulin. This change leads to the presence of highly cariogenic flora with noticeable increase of streptococcus mutans. Very aggressive destructive activity of the remaining teeth is noticed in a matter of months following irradiation (2).

In irradiated bone, the chief disturbances arise as a result of obliteration of blood vessels, decrease in cells and loss of

vitality. This type of bony tissue exhibits a poor response to infection and healing following dental extractions. Periodontal membrane is affected with disorientation of fibres, decreased cellularity and vascularity. Endodontic treatment in these cases is not encouraged and extractions carry the risk of osteoradionecrosis.

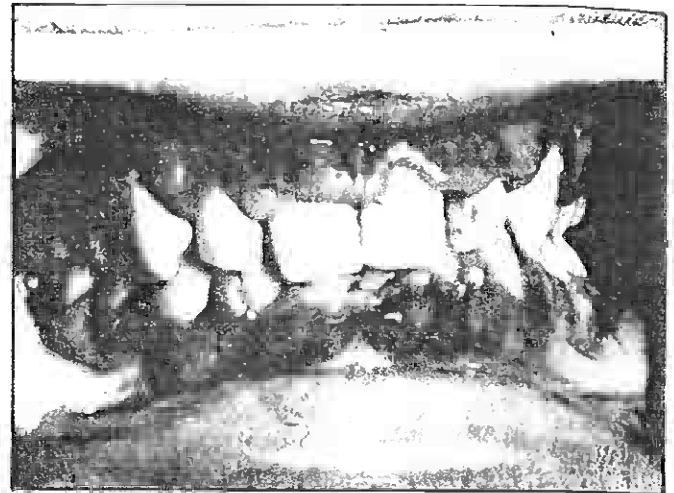


Fig. 4 Generalised gingivitis in acute leukaemia

CHEMOTHERAPY

Common agents that cause inflammatory reaction as a side effect are the antimetabolites. This action may be explained by the fact that unlike other group of drugs like alkylating agents, antimetabolites aim to destroy the cells that multiply rapidly. The mucosal surface cells undergo rapid turnover and ulcerations appear shortly after exposure to the drug and the areas affected include buccal, gingival mucosa and peri-tonsillar region. Chief offenders in this group are methotrexate and fluoruracil. During treatment of acute leukaemia with chemotherapeutic drugs complications can be in the form of gingivitis, mucositis, xerostomia, acid saliva and other problems similar to those caused by radiation therapy (fig. 4).

These drugs can also affect the bone marrow by depressing the formation of white blood cells and platelets. The immune reaction is thereby depressed leading to infection. Intensive treatment with drugs can lower the platelet count below 10,000/mm³ and this is an important factor in management of these patients.



Fig. 5 Osteoradionecrosis with pathologic fracture

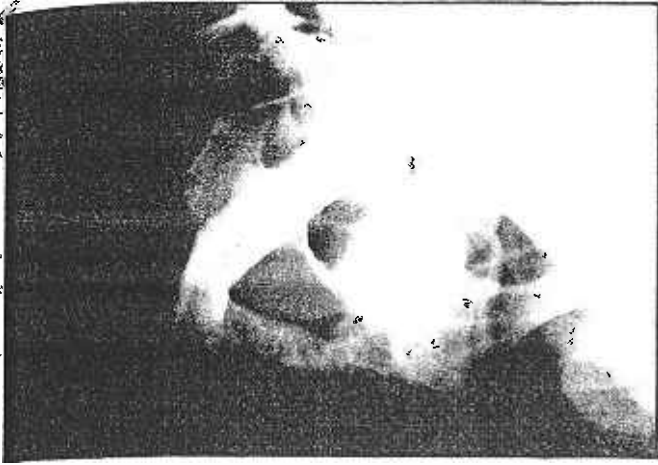


Fig. 6 Lateral oblique view of mandible showing area of necrosis.

DENTAL HELP

Dental status of all patients about to receive radiation therapy should be carefully evaluated. Factors that require particular attention include age, condition of remaining teeth, dental awareness and his ability to exercise good oral hygiene. Earlier view that all teeth be removed prior to radiotherapy is not a necessity if the patient has good dentition and is anxious to keep the teeth. Instruction in oral hygiene, use of a soft tooth brush, flossing and daily use of topical fluoride applications will help minimise radiation caries. Oral irrigation with saline and peroxide solutions help in lubricating soft tissues and by bringing the saliva to normal hydrogen ion concentration. Patients wearing dentures need frequent inspection for fit and cleanliness.

Pre-irradiation extraction of teeth is indicated in cases where the dentition is in a state of neglect, advanced breakdown or in advanced periodontal disease. Following extraction, surgery is carried out to ensure that all bony edges and spicules are carefully eliminated and primary healing promoted by careful suturing. Irradiation can bring about disturbances in the normal well balanced activities of osteoblasts and osteoclasts. This is seen more often in the mandible (3). In very severe cases of osteoradionecrosis, the characteristic features include trismus, pain swelling

damage to soft tissues and pathologic fracture (figs. 5, 6). Treatment consists of administration of antibiotics and careful removal of necrotic segments. Chemotherapeutic agents are normally administered systemically.

Complications in the oral cavity are not uncommon. Patients suffering from acute leukaemia receiving chemotherapy may present with ulceration, mucositis and associated dental problems similar to those caused by irradiation. It has been proposed that the increased incidence of malignancy associated with aging may be a consequence of impaired immune response although clearly many other factors may be responsible (4). In these cases dental surgeon may have to deal with a multitude of problems. In addition to poor hygiene, caries and periodontal disease, loss of blood and sepsis may be complication factors. During active period of the disease, control of infection with vigorous and repeated oral irrigations are indicated. Control of haemorrhage with periodontal dressings may be indicated in cases of gingival bleeding. Attempts should be made to lower the incidence of complications like monilial infection.

CONCLUSION

In maintenance of cancer patients, health personnel are often confronted with a multitude of problems that require a reasonable knowledge of the disease and problems related to therapy. Closer co-operation between the physician, dental surgeon and surgeon is an absolute must for no one man can be expected to control all the possible complications. Effective therapy for cancer patients therefore requires teamwork ideally by the combined effort of the entire health team.

REFERENCES

1. Frank R M, Herdly J, Phillip E: Acquired dental defects and salivary gland lesions after irradiation for carcinoma. *J Am Dent Assoc* 1965; 70: 868-83
2. Colby R A: Radiation effects on structures of oral cavity. *J Am Dent Assoc* 1942; 29: 1446-51.
3. Lawrence E A: Osteoradionecrosis of the mandible. *Ann J Roentgen and Rad therap* 1946; 55: 733-42
4. Gatti R A, Good R A: Aging, Immunity and Malignancy. *Geriatrics* 1970; 25: 158-68.