

The Need for Dental Treatment in a Group of Patients Undergoing Treatment for Malignancies Other Than of the Head and Neck

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Abstract - This paper reports the findings of an audit carried out to estimate the dental needs of patients undergoing oncology therapy for malignant disease at various sites of the body. All of the subjects were in-patients on an oncology ward. Over fifty percent of the patients had dental, periodontal or mucosal disease. It was concluded that there is a need to increase the dental service provided to cancer patients to allow further co-ordination between medical, dental and nursing staff for the prevention, management and resolution of oral complications of cancer therapy.

KEY WORDS: Malignancy, Treatment need, Oncology, Restorative Dentistry, Prevention

INTRODUCTION

Oral complications of chemotherapy for local and systemic malignant disease and radiotherapy to the head and neck region are common¹⁻⁴. Approximately 1.25 million Americans are diagnosed with cancer each year and forty percent (500,000) of these individuals develop oral side-effects to their therapy⁵. These sequelae include disturbances in the normal function and integrity of the orofacial tissues leading to mucositis, ulceration, xerostomia, infection, bone changes and a greater vulnerability to caries and periodontal disease⁶⁻⁹. Secondary complications as a consequence of dental infection in immunocompromised individuals may lead to life-threatening situations. Furthermore, a number of reports have identified a possible correlation between the presence of oral disease and an increased incidence of complications to therapy¹⁰⁻¹³.

A study by Toljanic *et al.* (1999) of patients scheduled to undergo intensive chemotherapy for cancer, determined that “patients with chronic dental pathology can safely proceed with chemotherapy without dental intervention, as conversion of chronic dental disease to an acute state during chemotherapy occurs infrequently”. The authors suggest that if intertherapy dental infections do arise, they can be managed effectively without interrupting therapy or adversely affecting oncology treatment outcomes¹⁴.

However, this is not the view shared by the majority of clinicians and associations involved in the management of this group of patients. A retrospective study by Rosenberg (1986) into oral complications arising from chemotherapy reported that some dental pathology could not be treated at the time of presentation as the patients were too ill to tolerate treatment¹⁵. For example, of 194 abscessed teeth, only 132 were treated thereby leaving 62 immunocompromised patients with potentially life-

threatening sepsis. Furthermore, a number of publications have emphasised the fact that oral complications of cancer therapy often have systemic consequences. Pain and discomfort can lower intake of fluid and nutrients, which in severe cases can lead to dehydration and malnutrition, requiring hospitalization¹⁶. More significantly, complications may lead to dose reductions, delays, or termination of cancer treatment, which reduces the chances of remission or cure^{4,5}. Even if the overall oncology treatment is not compromised, dental disease and local irritant factors may contribute greatly to oral side-effects of treatment and the patients overall sense of well being^{4,17,18}.

The US National Institutes of Health Consensus Development Conference, convened in 1989 to assess oral complications of cancer therapies, reported that “potentially complicating oral disease should be identified and corrected as early as possible before commencement of anti-cancer therapy”¹⁰. Patients who are scheduled to undergo cancer therapy should have a dental examination prior to treatment in order to identify and correct active disease and eliminate sites of infection or potential infection and ideally, patients should be made dentally fit before their therapy. However, the dentist’s role also extends to ensuring oral comfort during treatment, ensuring continued prevention of oral disease and infection, understanding the patient’s preferences, enhancing oral function when desired and maintaining the appearance of the patient to protect self-esteem¹⁹.

The Royal College of Surgeons of England recently released clinical guidelines for the oral management of patients requiring radiotherapy, chemotherapy or bone marrow transplantation²⁰. Among the recommendations laid out in the document are that, ‘every relevant oncology protocol includes an early pre-treatment oral assessment,’ and that, ‘a designated permanent member of dental staff is responsible for organising oral care’. These guidelines also emphasised the need for dental care during and following treatment.

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A significant amount of untreated dental and oral disease exists among oncology patients, the treatment of which could be expected to reduce the incidence of complications to therapy^{6,15,17,21}. Sonis and Kunz (1988) reported that the initiation of protocols to improve dental care reduced the incidence of patients with non head and neck malignancies developing oral complications during the course of their therapy from 38.7% to 10.5% over a six year period²².

The aim of this audit was to estimate the dental needs of a group of patients undergoing oncology treatment at Aberdeen Royal Infirmary and to determine if an expansion of the service offered by the Department of Restorative Dentistry was required.

MATERIALS AND METHODS

Data collection

A dental history was taken from forty patients undergoing chemotherapy or radiotherapy for tumours affecting various sites in the body. The aims of this questioning were to establish a brief dental history of the patient; reveal the level of perceived untreated dental problems; ascertain the incidence of oral complications as a result of therapy; and determine the patient's perceived need for treatment as related to subsequent clinical findings. All of the subjects were in-patients on an oncology ward at Aberdeen Royal Infirmary.

A basic dental examination was carried out according to a set protocol. This comprised extra-oral and intra-oral inspection. Any facial asymmetry, swelling, lymphadenopathy, or other abnormal finding was noted. Intra-orally, the soft tissues were examined and a charting of the teeth was carried out. The presence of caries and any other obvious dental problems such as loose or deficient crowns and bridgework, fractured teeth, etc was noted. A periodontal screening using the Basic Periodontal Examination (BPE)²³ was carried out and the level of oral hygiene noted. Edentulous ridges and the condition of removable prostheses were also examined. This consisted of inspection of the retention, stability, occlusion, extension of the dentures and the support they provided to the facial tissues.

This clinical examination was carried out at the bedside using a mouth mirror, straight probe, periodontal probe and a pen torch.

A brief medical history was recorded using the case notes. No attempt was made to standardise the history taking or examination beyond that normally carried out in the clinical setting.

Information was collected between September and November 1999. The history taking and examination was carried out by the same clinician (DB) and all of the patients involved were under the care of the same Consultant Oncologist from whom permission for contacting the patients had been given. This consultant is one of seven oncologists based at the Royal Infirmary.

RESULTS

Forty patients were examined and had an average age of 62 years (range 22 to 80 years). Of these, 65% (26) were male and 35% (14) female. All were undergoing treatment with chemotherapy, radiotherapy, surgery or a combination of the three as detailed in *Table 1*. None of the patients were treated with surgery alone and 20% (8) patients had not received any treatment at the time of examination.

The patients were undergoing treatment for malignant disease at a variety of sites as detailed in *Table 2*. In total 40% (16) of patients were recorded as having known metastases, indicating late stage disease.

Only 32.5% (13) of patients were registered with a general dental practitioner. In respect of perceived treatment need 45% (18) of patients reported no problems with their oral health. Of those with a presenting complaint, 17.5% (7) had a sore mouth/ ulceration at either the time of examination or previously, during treatment; 12.5% (5) had problems with their dentures; 7.5% (3) complained of a dry mouth; 5% (2) reported 'gum disease'; 5% (2) complained of toothwear and 7.5% (3) stated a requirement for 'general treatment'.

On examination, 50% (20) of patients were edentulous. The remaining half of the group had an average of 19.6 teeth. Forty-eight removable prostheses were examined and of these 29% (14) were deemed to be unsatisfactory. In total, 70% (28) of patients had at least one complete or partial denture. Caries was recorded in 22.5% (9) of patients, just under half of those with teeth, with an average number of 3.1 carious lesions per patient. Basic hygiene therapy was required in 35% (14) of patients with more extensive periodontal treatment, based on a BPE score of 4, being required in a further 15% (6). Denture hygiene instruction was needed in 12.5% (5) of cases. Extractions were felt to be unavoidable in one

Table 1. *Type of therapy received by the patients in the study.*

Chemotherapy alone	62.5% (25)
Chemotherapy + surgery	2.5% (1)
Chemotherapy + radiotherapy	7.5% (3)
Radiotherapy alone	2.5% (1)
Radiotherapy + surgery	5.0% (2)
Surgery alone	None
Awaiting treatment	20.0% (8)

Table 2. *Site of malignant disease.*

Lung	25.0% (10)
Oesophageal	25.0% (10)
Stomach	17.5% (7)
Pancreas	15.0% (6)
Colorectal	7.5% (3)
Melanoma	5.0% (2)
Glioblastoma	2.5% (1)
Liver metastases	22.5% (9)
Lung metastases	2.5% (1)
Spinal metastases	12.5% (5)
'metastases'	12.5% (5)
Not recorded	5.0% (2)

Table 3. *Pathology diagnosed*

<i>Condition</i>	<i>%</i>	<i>No. of patients affected</i>
Caries	22.5	9
Periodontal disease	50.0	20
Denture-induced stomatitis	17.5	7
Xerostomia	5.0	2
Angular cheilitis	2.5	1
Mucositis	2.5	1
Fibroepithelial polyp	2.5	1
Acute candidosis	2.5	1
Frictional keratosis	2.5	1

patient (2.5%). *Table 3* shows the level of disease detected in the patients examined.

As shown in *Table 3*, 45% (18) of patients were found to have dental caries, significant periodontal disease (BPE=4) or infection of the oral mucosa. It must be repeated that these figures reflect the findings of the patients of just one of the seven oncologists in Aberdeen and therefore the total number of affected individuals over the period of the study is likely to have been significantly higher.

DISCUSSION

Relatively few patients were found to be experiencing acute symptoms at the time of examination, however 45% (18) were seen to be in need of treatment for dental caries, periodontal disease or treatment of infection of the oral mucosa. In this study, only one third of subjects were registered with a general dental practitioner. Lizi (1992) found that only 11.2% of patients who reported regular visits with a general dentist before a diagnosis of oral cancer were considered to have no dental conditions that required treatment before radiation therapy²⁴. Furthermore, Lockhart and Clark (1994), in a study to determine the dental status of patients before multimodality treatment for head and neck cancer, found that 97% of patients needed dental care prior to oncology therapy²⁵.

However, it is likely that the findings of this study are an underestimate of the disease level as the examination was carried out under less than ideal circumstances in the absence of an operating light and '3 in 1' syringe to satisfactorily illuminate and dry the teeth, compromising the ability to detect early caries or deficient crown margins. In addition, no radiographic examination of the patients was carried out which may have allowed the detection of interproximal and recurrent caries as well as providing an assessment of periodontal bone loss and periapical pathology. Lockhart and Clark (1994), found that although 22 of the patients they examined had no obvious caries at the initial screening exam, 11 (50%) of this group were found to have caries as a result of a more thorough oral evaluation. They also reported that of those patients subsequently followed by the hospital dental service, 42% were found to have radiographic evidence of pathosis at the apex of one or more teeth that were asymptomatic and without clinical evidence of disease²⁵.

Almost one third of all removable appliances examined were determined to be 'poor' and unsatisfactory. In those patients suffering from xerostomia, mucosal atrophy and a compromised immune system, an unstable and

unretentive denture is likely to contribute further to soreness, ulceration and local infection. In addition to this, in those patients who have undergone radiotherapy to the head and neck region, local trauma due to an ill-fitting prosthesis increases the risk of osteoradionecrosis²⁰.

With the exception of the BPE, all clinical findings were of a subjective nature based on the assessment and experience of the clinician involved. The use of subjective terms such as 'satisfactory' and 'poor' used to describe oral hygiene levels and the fit of dentures are vague in the absence of any set criteria. Likewise, no attempt was made to classify the severity of dental caries or denture-induced stomatitis, and no formal assessment of the patient's own perceived need for treatment with respect to their health related quality of life was performed. However, the purpose of the study was to merely establish a broad estimate of the level of disease within the chosen population. All of these areas may be looked at in a more objective manner in the future in a more structured piece of clinical research with much a larger sample size. In particular, examination of pre- and post- therapy cohorts would be useful to establish levels of disease prior to the start of the cancer treatment and the subsequent incidence of complications. A retrospective study of 3372 patients receiving chemotherapy revealed that 398 presented with chemotherapy-related oral complications¹⁵. Comparison of the site of the malignancy and type of chemotherapy used with the severity of the oral complications would also be of benefit but clearly a study with greater numbers than this audit would be required to have the power to achieve this.

There were no patients with head and neck malignancy included in the study. Any non-surgical therapy carried out for patients with head and neck tumours tends to be done on an outpatient basis. Future comparison of the amount of dental disease in this group with groups of patients with malignancies elsewhere in the body would be very valuable, especially considering the increased incidence of xerostomia that is likely to be present due to the effects of radiation on the salivary glands²⁶. The consequences of failing to eradicate dental disease prior to treatment in this group are likely to result in more significant complications. In those patients who have had radiotherapy to the head and neck region, extraction of teeth and uncontrolled periodontal disease increases the risk of osteoradionecrosis developing²⁷. Also, this group of patients, in common with the general population, are increasingly retaining their teeth to a greater age but are likely to have more untreated dental disease^{25,28}.

It is hoped that much of the dental disease in head and neck oncology patients at Aberdeen is treated, as an established team is in place for the care of this group. This team includes a Consultant in Restorative Dentistry who is active at all stages of treatment from the diagnosis of the malignancy and treatment planning to the reconstruction and rehabilitation of the patients. The early detection and management of dental disease is considered a priority in order to help prevent any possible complications. It is recognised by those involved in the management of oral cancer that this integrated service should be established at all centres treating the disease^{10,20,22,25,29}.

CONCLUSION

Over 50% of patients in this survey undergoing treatment for malignant disease at sites throughout the body had untreated dental disease or experienced oral side effects of therapy. To set a higher standard for care, emphasis should be placed on the prevention of oral complications and a close relationship should be established between all of those involved in the care of this group of patients in order to share knowledge and provide dental care when required.

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REFERENCES

1. Dale, R.A., Harrison, J.S. and Redding, S.W. Oral complications in cancer chemotherapy, cancer incidence, and mortality in the U.S. *Gen. Dent.*, 2004; **52(1)**:64–71; quiz 72.
2. Scully, C. and Epstein, J.B. Oral health care for the cancer patient. *European Journal of Cancer. Part B, Oral Oncology* 1996; **32(B)**:281–292.
3. Sonis, S.T., Sonis, A.T. and Lieberman, A. Oral complications in patients receiving treatment for malignancies other than of the head and neck. *Journal of the American Dental Association* 1978; **97**:468–472.
4. Sadler, G.R., Stoudt, A., Fullerton, J.T., Oberle-Edwards, L.K., Nguyen, Q. and Epstein, J.B. Managing the oral sequelae of cancer therapy. *Medsurg Nursing*, 2003; **12(1)**:28–36.
5. Massler, C.F., Jr. Preventing and treating the oral complications of cancer therapy. *Gen. Dent.*, 2000; **48(6)**:652–655.
6. Joyston-Bechal, S. Prevention of dental diseases following radiotherapy and chemotherapy. *Int. Dent. J.*, 1992; **42(1)**:47–53.
7. Madeya, M.L. Oral complications from cancer therapy: Part 1 – Pathophysiology and secondary complications. *Oncol. Nurs. Forum*, 1996; **23(5)**:801–807.
8. Dreizen, S., Bodey, G.P. and Rodriguez, V. Oral complications of cancer chemotherapy. *Postgrad. Med.*, 1975; **58(2)**:75–82.
9. Driezen, S. Stomatotoxic manifestations of cancer chemotherapy. *J. Prosthet. Dent.*, 1978; **40**:650–655.
10. National Institutes of Health consensus development conference statement: oral complications of cancer therapies: diagnosis, prevention, and treatment. *J. Am. Dent. Assoc.*, 1989; **119(1)**:179–83.
11. Peterson, D.E. and D'Ambrosio, J.A. Diagnosis and management of acute and chronic oral complications of nonsurgical cancer therapies. *Dent. Clin. North Am.*, 1992; **36(4)**:945–966.
12. Peterson, D.E. Pretreatment strategies for infection prevention in chemotherapy patients. *NCI Monogr.*, 1990; **9**:67–71.
13. Rosenberg, S.W. Oral care of chemotherapy patients. *Dental Clinics of North America*, 1990; **34**:239–250.
14. Toljanic, J.A., Bedford, J.F., Larson, R.A. and Fox, J.P. A prospective pilot study to evaluate a new dental assessment and treatment paradigm for patients scheduled to undergo intensive chemotherapy for cancer. *Cancer*, 1999; **85(8)**:1843–1848.
15. Rosenberg, S.W. Oral complications of cancer chemotherapy – a review of 398 patients. *J. Oral Med.*, 1986; **41(2)**:93–97.
16. Wingard, J.R. Oral complications of cancer therapies. Infectious and noninfectious systemic consequences. *NCI Monogr.*, 1990; **9**:21–26.
17. Hancock, P.J., Epstein, J.B. and Sadler, G.R. Oral and Dental Management Related to Radiation Therapy for Head and Neck Cancer. *J. Canad. Dent. Assoc.*, 2003; **69(9)**:585–590.
18. De Conno, F., Ripamonti, C., Sbanotto, A. and Ventafridda, V. Oral complications in patients with advanced cancer. *J. Palliat. Care*, 1989; **5(1)**:7–15.
19. Chiodo, G.T., Tolle, S.W. and Madden, T. The dentist's role in end of life care. *General Dentistry*, 1998; **48(6)**:560–565.
20. England. RCoSo. The Oral Management of Oncology Patients Requiring Radiotherapy: Chemotherapy: Bone Marrow Transplantation: Royal College of Surgeons of England, 1999.
21. Beck, S. Impact of a systematic oral care protocol on stomatitis after chemotherapy. *Cancer Nursing*, 1979; **2**:185–199.
22. Sonis, S. and Kunz, A. Impact of improved dental services on the frequency of oral complications of cancer therapy for patients with non-head-and-neck malignancies. *Oral Surg. Oral Med. Oral Pathol.*, 1988; **65(1)**:19–22.
23. Periodontology BSo. Periodontology in general dental practice in the United Kingdom. A first policy statement: British Society of Periodontology, 1992.
24. Lizi, E.C. A case for a dental surgeon at regional radiotherapy centres. *Br. Dent. J.*, 1992; **173(1)**:24–26.
25. Lockhart, P.B. and Clark, J. Pretherapy dental status of patients with malignant conditions of the head and neck. *Oral Surg. Oral Med. Oral Pathol.*, 1994; **77**:236–241.
26. Vaughan, E.D. An analysis of morbidity following major head and neck surgery with particular reference to mouth function. *J. Maxillofacial Surgery*, 1982; **10**:129–134.
27. Galler, C., Epstein, J.B., et al. The development of osteoradionecrosis from sites of periodontal disease activity: report of three cases. *J. Periodontology*, 1992; **63**:310–316.
28. Adult Dental Health 1988: HMSO, 1990.
29. Carl, W. Local radiation and systemic chemotherapy: preventing and managing the oral complications. *J. Am. Dent. Assoc.*, 1993; **124(3)**:119–123.