

## Analysis of 2167 head and neck cancer patients' management, treatment compliance and outcomes from a regional cancer centre, Delhi, India

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### Abstract

Head and neck cancer care was analysed in 2167 unselected patients for management compliance and outcome. Median age was 55 years, with a male to female ratio of 5.5:1. Major sites were oropharynx (32.4 per cent), larynx (19.8 per cent), oral (16.6 per cent) and hypopharynx (12.9 per cent). Stage-wise distribution was I–II = 8.9 per cent, III = 20.6 per cent and IV = 60.3 per cent and unstaged = 10.2 per cent. Squamous cell carcinoma was the dominant histology for 90.9 per cent. Clinic-based cancer-directed treatment decisions were made for 1905 patients: curative intent in 53 per cent, palliative in 35 per cent and for the remaining 262 (12 per cent) supportive care. Overall, 1209 (56 per cent) patients complied with the prescribed treatments; 62 per cent, 54 per cent, and 35 per cent of curative, palliative and supportive care intent groups, respectively. Modalities were radiotherapy alone (64.6 per cent), combined surgery with irradiation (17.6 per cent), and chemoradiotherapy (11.2 per cent). Median follow-up periods were 17.5 and three months in curative and palliative groups respectively. Overall, 712 (33 per cent) cases received curative therapy, with three-year disease-specific survival of 49 per cent. Patient compliance was a major obstacle. The comparison of this series with the USA, Canada and Norway showed wide disparities in stage of presentation and survival.

**Key words:** Head and Neck Neoplasms; Outcome Assessment, Patient; Compliance; India

### Introduction

Head and neck cancer is a major oncological burden in developing countries.<sup>1</sup> The issue of care in terms of the proportion of patients with different therapy intents, patient compliance with management and treatment outcomes remains largely unaddressed. According to the estimates of Globocan 2000, worldwide 600 000 new head and neck cancer cases are diagnosed annually and 25 per cent of this annual disease-specific burden is contributed by India.<sup>2</sup> Head and neck cancers occur in various subsites, and a wide range of expertise is needed for both diagnostic and multidisciplinary management strategies. In view of the locoregional nature of disease extent, the diagnosis at early stages combined with effective therapeutic interventions have shown gratifying five-year disease-specific survivals of 60 per cent or more for all head and neck cancers in the USA, Canada, Norway and the UK.<sup>3–6</sup>

Variations in staging process and treatment regimens have not been found to affect the treatment outcomes between the European and American

continent because of therapeutic interventions done at early stages.<sup>4,6</sup> Comparison with these results shows that head and neck cancer survival is much lower in India.<sup>7–9</sup> This paper presents some of the unaddressed issues faced in the care process at a regional cancer centre in India.

Assessment of patient records at local/regional level and for specific disease entities is a useful method for evaluating the quality of the health service and these can then be shared by all professionals.<sup>10–12</sup> These activities have further benefited the patients and doctors in establishing practice care standards for a particular disease e.g. head and neck cancer in the UK.<sup>13</sup> In recent years there has been wide concern about head and neck cancer occurring in developing countries; with suggestions that realistic quality reviews are necessary, and the patient's acceptance of treatment is critical to overall outcomes.<sup>1,14</sup> Earlier reports from India analysed the institutional<sup>7</sup> and Mumbai region population-based<sup>8,9</sup> survivals in the cases treated. This report presents the overall data related to consecutively registered unselected

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head and neck cancer patients in a major regional cancer centre in India as regards: disease sites, stage of presentation, multidisciplinary clinic-based treatment decisions, and subsequent patient compliance to cancer-directed treatments, and outcomes in the treated cases.

This analysis will be a helpful indicator to assess the various cancer-directed aims; broad treatment modalities required; need for palliative care in advanced stages; and proportion of the diagnosed patients non-compliant to planned therapy. Besides establishing cancer care facilities; addressing these issues will improve the organization of head and neck cancer care within institutions in less developed countries.

### Materials and methods

This report is comprised of 2167 consecutively registered head and neck cancer patients in the Head and Neck (HN-B) clinic of the Institute Rotary Cancer Hospital from January 1996 to December 1998. The Institute Rotary Cancer Hospital is the cancer centre of the All India Institute of Medical Sciences, New Delhi, and it is recognized as one of the 17 regional cancer centres under the National Cancer Control Programme of the Government of India. The HN-B clinic, held twice a week in afternoon hours, is a multidisciplinary combined clinic attended by faculty and resident staff of ENT and head and neck surgery, radiotherapy, and medical oncology. All new and old patients are registered in this clinic; for diagnosis, management and follow up. The staging and treatment decisions are carried out conjointly and the disease and treatment processes are explained to the patients/relatives. The likely outcome of a prescribed (planned) regimen and the treatment-related morbidities are explained. Individual patient/relative consent is obtained before therapeutic intervention. After treatment(s) in respective disciplines, patients are advised to return to the clinic for periodic follow up; once a month in the first year, every two to three months in the second and third years and subsequently at six monthly intervals. More than 60 per cent of our patients come from distances of 200 kms or more and are from low socio-economic backgrounds.

The patient evaluation included clinical history, a general physical and a head and neck examination, endoscopic assessments, biopsy, blood examinations, chest X-ray, and, when necessary, a computed tomography scan of the involved head and neck region. Histological confirmation was recorded and staging classification was done during this period as per the International union against cancer/union internationale contre le cancer (UICC) (1992 & 1997) system. The HN-B clinic has been operational since 1981 and over the period the treatment protocols for each site and stage have been developed and modified from time to time. For example, stage III–IV operable laryngeal cancers were treated by laryngectomy and post-operative radiotherapy before 1997 but now the patient is offered the options of combined chemoradiotherapy or surgery and post-operative irradiation, with due explanations. In carcinomas of the oral

cavity, larynx and hypopharynx early stage I–II are treated by conservation surgery/definitive radiotherapy, whereas advanced stage III–IV are divided into operable and inoperable groups. The advanced operable group is managed by our standard approach of combined surgery and radiotherapy, and selected patients were offered chemoradiotherapy (larynx and hypopharynx). Carcinomas of the oropharynx and nasopharynx were divided into curable and incurable groups; the curable group received radical radiotherapy/chemo-irradiation. Carcinomas of the paranasal sinuses (PNS), salivary gland and ear were usually treated by surgery with or without radiotherapy, except for those who had an advanced/inoperable presentation. Curative (radical) radiotherapy doses were in the range of 60–70 Gray (Gy), pre-operative irradiation was in the order of 45–50 Gy and post-operative radiotherapy was in the range of 56–64 Gy, uniformly at 1.8–2 Gy per fraction delivered as five fractions per week on a protracted course. The aim of surgery was to achieve oncological clearance. Non-squamous cell neoplasms were individualized for treatment by surgery, radiotherapy, chemotherapy or combinations depending upon location, histology and stage. Head and neck lymphomas and paediatric neoplasms were usually treated by chemoradiotherapy. All advanced inoperable/incurable patients were treated by short courses of radiotherapy, usually 20 Gy over a one week duration, combined with supportive care drugs.<sup>15</sup> Pain medication was prescribed by the WHO-3-step ladder, and patients who needed oral morphine were referred to the pain clinic of the Institute Rotary Cancer Hospital.

The treatment decision made at the HN-B clinic, compliance of patient to the therapy and the modalities of treatment were critically analysed. The patient records were accessed up until February 2002 for follow up, outcome and survival purposes.

### Statistical analysis

The data were recorded on pre-designed proforma, managed on Excel<sup>®</sup> spreadsheets and entries were checked for any errors. In this study, we have considered two primary outcome variables; namely time to death or last visit from the HN-B clinic registration, and adherence to initial treatment decision (yes or no). Survival time analysis was performed in three steps. In step one median survival time and Kaplan–Meier survival estimates were done for treatment intent (curative or palliative) and for different head and neck sites. In step two the unadjusted hazard ratios (HR) (95 per cent confidence interval [CI]) were assessed for each potential risk factor and in step three the multivariate Cox-regression model was used to determine adjusted HR (95 per cent CI) for independent significant risk factors. For the second binary outcome variable, i.e. adherence to treatment, the analysis was done as follows: a chi-square test was done to determine the association of various potential risk factors and a binary logistic regression was used to compute the unadjusted odds ratio (OR) (95 per cent CI).

Finally, all potential risk factors were simultaneously considered in a multivariate step-wise logistic regression model to compute the adjusted OR (95 per cent CI). STATA 8.0 intercooled version statistical software (STATA Corporation, Houston, Texas, USA) was used for data analysis in this study; all the tests were two-tailed, and a *p* value <0.05 has been considered as statistically significant.

## Results

During the three-year period (1996–1998), a total of 14 470 histologically-proven cancer patients were registered as new cases in the Institute Rotary Cancer Hospital and out of these 2476 (17 per cent) were head and neck cancer cases. The data analysis included 43 variables with emphasis on patient and disease descriptors, the treatment decision obtained at the HN-B clinic (plus patient's choice where indicated), modality chosen, type of therapy (curative/palliative/supportive care), compliance to treatment decision/option (cases handled yes or no), follow up, and disease status at last visit to clinic (no evidence of disease (NED), residual, progressive, recurrence, distant metastasis, second primary). No attempt was made during the period of data analysis to contact the patients. The 'treatment' analysis refers to the initial course of cancer-directed therapy (surgery, radiotherapy, chemotherapy or combinations) or supportive care decided (planned) in the clinic and then complied with (treated) or not by the patient. Any subsequent therapy is not included in this report.

From the overall count of 2476 consecutively registered head and neck cancer patients; 309 were excluded – 140 incomplete records, 150 patients treated elsewhere before registration and 19 others treated both at the Institute Rotary Cancer Hospital and elsewhere. Thus, the final analysis of this report is concerned with 2167 patients. The average duration of diagnostic workup and pre-treatment staging ranged from five days to 49 days. Patient and disease-related characteristics are shown in Table I. Males outnumbered females at a sex ratio of 5.5:1. Age ranged from two years (rhabdomyosarcoma) to 98 years (salivary gland tumour); with a median age of 55 years in this cohort. The largest proportion (29.3 per cent) were in the 51–60 years age group and 19 per cent of patients were below 40 years. There were four major sites (81.7 per cent of all cases) in this study, seen in decreasing order as oropharynx (32.4 per cent), larynx (19.8 per cent), oral cavity (16.6 per cent), and hypopharynx (12.9 per cent). The predominant histological type was squamous cell carcinoma in 1969 (90.9 per cent) cases, adenocarcinoma and variants in 57 (2.6 per cent), sarcomas in 40 (1.8 per cent), lymphomas in 37 (1.7 per cent), and other histological types in the remaining 64 (3 per cent) patients. Stage grouping showed early stages (I–II) in 193 (8.9 per cent), the largest group being stage IV in 60.3 per cent and 10.2 per cent were unstaged.

The treatment decisions taken (planned) and recorded in the clinic, and the numbers treated and

TABLE I  
PATIENT AND DISEASE CHARACTERISTICS (*n* = 2167)

Characteristic	Number	Per cent
Male	1834	84.6
Female	333	15.4
Age (years)		
<20	58	2.7
21–30	90	4.1
31–40	264	12.2
41–50	555	25.6
51–60	635	29.3
61–70	426	19.7
71–80	119	5.5
>80	20	0.9
Site		
Oral	360	16.6
Oropharynx	702	32.4
Hypopharynx	280	12.9
Larynx	429	19.8
Nose & PNS	124	5.7
Nasopharynx	62	2.9
Others	210	9.7
Stage grouping		
I	52	2.4
II	141	6.5
III	446	20.6
IV	1307	60.3
No Staging	221	10.2
Histology		
Squamous cell carcinoma	1969	90.9
Adenocarcinoma & variants	57	2.6
Sarcomas	40	1.8
Lymphoma	37	1.7
Other	64	3.0

PNS = paranasal sinuses

not treated (patient's non-compliance) are shown in Table II. The planned intents were curative in 1150, and palliative in 755, i.e. anti-cancer therapy in 1905 patients and in the remaining 262 cases with terminally advanced disease the intent was to provide supportive measures. Out of the different treatment decision (planned) groups, 712/1150 (62 per cent); 406/755 (54 per cent); and 91/262 (35 per cent) in curative, palliative and supportive care groups, respectively, complied with the intended therapy at our institution. A total of 1118 patients (51.6 per cent of all; curative, 712; palliative, 406) received anti-cancer treatments. Overall, 56 per cent complied with the planned decisions and undertook treatments in this centre and 33 per cent (712/2167) of all patients were treated curatively. The remaining 44 per cent did not come for treatment at the Institute

TABLE II  
INTENT OF THERAPY: TREATMENT DECISIONS, TREATED AND NOT TREATED PATIENTS (*n* = 2167)

Intent	Planned (%)	Treated (%)	Not treated (%)
Curative	1150 (53)	712 (62)	438 (38)
Palliative	755 (35)	406 (53)	349 (46)
Supportive	262 (12)	91* (35)	171 (65)
Total	2167	1209 (56)	958 (44)

Note: 91\* patients attended the pain and palliative care clinic of the Institute Rotary Cancer Hospital. Parenthesis indicates percentage within the group.

TABLE III

MODALITY-WISE DISTRIBUTION OF PLANNED, TREATED AND NOT TREATED PATIENTS IN CURATIVE AND PALLIATIVE GROUPS ( $n = 1905$ )

Modality	Total (%)	Curative			Palliative		
		Planned	Treated (%)	Not treated	Planned	Treated (%)	Not treated
RT	1300 (68.2)	620	383 (61.7)	237	680	339 (49.8)	341
Surgery	59 (3.1)	59	30 (50.8)	29	—	—	—
Surgery+RT	321 (16.9)	320	196 (61.2)	124	1	1 (100)	—
Chemo+RT	173 (9.1)	134	88 (65.6)	46	39	37 (94.9)	2
Other	52 (2.7)	17	15 (88.2)	2	35	29 (82.8)	6
Total	1905	1150	712	438	755	406	349

RT = radiotherapy

Rotary Cancer Hospital after obtaining and discussing treatment decisions/options, the objective of the therapy and the likely outcome. The supportive care patients were offered pain and symptom relief measures and only 35 per cent of this group attended the pain clinic.

The data on the 1905 patients selected for curative and palliative intents have been further analysed modality-wise as per the treatment decisions, and then treatment received or not received at our institution (Table III). Major cancer-directed treatment decisions were for radiotherapy alone, combined surgery and radiotherapy, and chemo-irradiation in 68.2 per cent, 16.9 per cent and 9.1 per cent, respectively. The 'other' treatment decision category included patients who were offered a combination of treatments such as chemotherapy, surgery, and radiotherapy in various sequences mainly for sarcomas, lymphomas, other site tumours; or as planned surgery after chemotherapy with or without radiotherapy. Out of 1118 treated cases, either curatively (712) or palliatively (406), modality-wise distributions were:

TABLE IV

FACTORS INFLUENCING THE TREATED ( $n = 1118$ ) AND NOT TREATED ( $n = 1049$ ) GROUPS

Factor	Treated	Not treated	$\chi^2$	OR (95% CI)
Age				
</=50 yrs	493	474	—	1.0
>50 yrs	625	575	0.398	0.92 (0.76–1.11)
Sex				
Male	967	867	—	1.0
Female	151	182	0.007	1.45 (1.10–1.93)
Stage				
I–II	120	73	—	1.0
III–IV	872	881	0.006	1.55 (1.13–2.13)
Site				
Oral	165	195	—	1.0
Oropharynx	378	324	0.014	0.72 (0.56–0.93)
Hypopharynx	135	145	0.549	0.90 (0.66–1.24)
Larynx	244	185	0.002	0.64 (0.48–0.85)
Nose & PNS	64	60	0.267	0.79 (0.52–1.19)
Nasopharynx	30	32	0.710	0.90 (0.52–1.54)
Other	102	108	0.527	0.89 (0.63–1.25)
Treatment modality				
Surgery+RT	197	124	—	1.0
RT	722	578	0.059	1.27 (0.99–1.63)
Other	199	347	0.0001	2.77 (2.08–3.68)

PNS = paranasal sinuses; RT = radiotherapy

radiotherapy alone (64.6 per cent), surgery alone (2.7 per cent), surgery combined with irradiation (17.6 per cent), chemoradiotherapy (11.2 per cent) and 'other' treatments in 3.9 per cent of cases.

For the purpose of deriving meaningful analysis of patient compliance and survival, anti-cancer therapies were designated as curative and palliative. Similarly, compliance to therapy decisions were categorized into broadly three modality groups, that is, combined surgery and radiotherapy, radiotherapy, and other treatment type/combination. Factors influencing the patient compliance to treatment decisions, i.e. treated and untreated groups, are shown in Table IV. Age and site had no bearing on subjects who did or did not complete treatment, except for those with laryngeal cancer who were more likely to comply ( $p = 0.002$ , odds ratio (OR): 0.64 [0.48–0.85]). Females ( $p = 0.007$ , OR: 1.45 [1.10–1.93]) and stage III–IV ( $p = 0.006$ , OR: 1.55 [1.13–2.13]) were significantly less compliant to therapy decisions, so also were patients advised about other treatment modalities ( $p = 0.001$ , OR: 2.77 [2.08–3.68]).

The overall median follow up in this study was 11.6 months; it differed for the different treated groups, 17.5 months (range 1–71.8 months) and 3.2 months (range 0.2–38 months) for curative and palliative intents, respectively (Figure 1). Median survival time was analysed in the curatively treated patients (Table V). Site-wise survival did not show any significant difference, except for laryngeal cancer which attained the best median survival (33.4 months,  $p = 0.001$ , hazard ratio (HR): 0.59 [0.45–0.77]) and

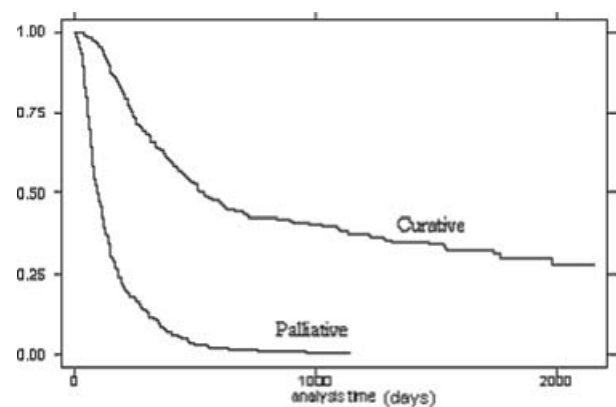


FIG. 1

Kaplan-Meier survival estimates by treatment intent.



the lowest numbers of survivors were in the oropharynx (12.5 months), and nose and paranasal sinuses (11 months) tumours groups in this study. Sex had no influence. Combined surgery and radiotherapy had a significantly higher survival rate (50.7 months), compared to radiotherapy (14 months,  $p = 0.001$ , HR:3.86 [2.92–5.11]) and other treatments (16.7 months,  $p = 0.001$ , HR: 2.67 [1.96–3.64]). This is shown in Figure 2. Out of the 712 curatively treated patients, 346 remained disease free at the last follow-up visit, with a three-years actuarial survival rate of 49 per cent.

## Discussion

There is no published literature, to the best of our knowledge, on multidisciplinary clinic-based pre-treatment assessment, initial cancer-directed treatment decisions, and subsequent patient compliance to the prescribed therapy in head and neck cancer. A wide spectrum of treatments are known to be used for cancers arising from various subsites of the head and neck region.<sup>3–5,14</sup> It is apparent that a multidisciplinary clinic which synthesizes and organizes the expertise provided by different specialties is the ideal setting for a patient to access optimal care.<sup>13</sup> The diagnosis, staging and pre-treatment assessment before treatment planning in a multidisciplinary head and neck clinic will avoid disparities in standards of care, and joint decision-making is suitable to provide the patients and their families with a fully-informed, balanced and timely opinion. The main emphasis of this study was on identifying the disease characteristics, patient compliance to treatment decisions, and the broad outcomes.

Head and neck cancers constitute 5.9 per cent of the global cancer burden and 68.8 per cent of these newly diagnosed cases are seen in less developed countries, with India contributing 152 604 (25 per cent) of cases.<sup>2</sup> However, this estimate is limited to

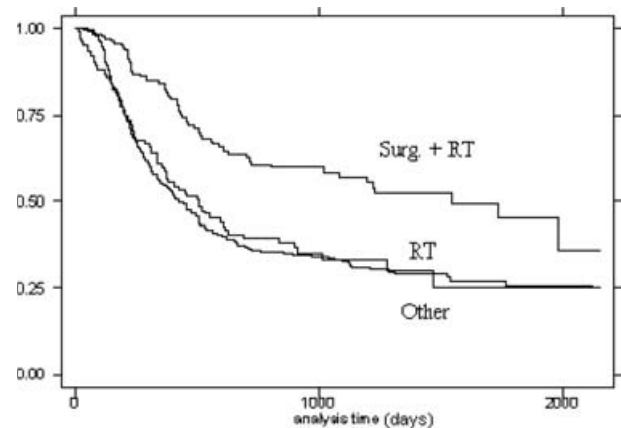


FIG. 2

Kaplan–Meier survival estimates by modality of treatment.  
RT = radiotherapy

only four subsites of the head and neck region, i.e. oral cavity, other pharynx, larynx and nasopharynx. Thus the actual disease load of head and neck cancers is much larger. At present cancers of the head and neck represent 4.3 per cent of all cancers in the more developed world. The National Cancer Data Base report, accrued between 1985 and 1994, showed that 6.6 per cent of all cancers in the USA originated in the head and neck.<sup>5</sup> Our institutional registration over a three-year period showed 17 per cent accrual of head and neck cancers, a nearly five times higher burden than seen in more developed countries. The average age at presentation was 55 years in this study, similar to an earlier report from Mumbai,<sup>7</sup> but the disease usually presents between 60–69 years of age in the USA, Canada and Norway.<sup>4,5</sup> Compared to a male to female ratio of 1.5–3:1 in western countries,<sup>4,5,16</sup> males outnumbered females in a ratio of 5.5:1 in our data. The histological types differed widely between the USA<sup>5</sup> and our data for similar periods (Table VI), i.e. squamous cell carcinoma (55.8 per cent versus 90.9 per cent), adenocarcinoma (19.4 per cent versus 2.6 per cent), and lymphoma (15.1 per cent versus 1.7 per cent).

A distinct improvement in stage recording was noticed in our data, i.e. no staging in 10.2 per cent of the cases compared to 27.3 per cent from the hospitals in the USA.<sup>5</sup> This may be due to our policy of pre-treatment assessment in the multidisciplinary clinic.

A comparative evaluation of patients, disease and treatment characteristics of our Delhi audit and those reported from the USA<sup>5</sup>, and Canada and Norway<sup>4</sup> is presented in Table VI. The case series from Kingston, Canada and Oslo, Norway, reported by Hall *et al.*,<sup>4</sup> is a population-based comparison, and the largest series from the National Cancer Data Base represents hospital-based registries' data from the USA<sup>5</sup> similar to our present single hospital series. The international union against cancer/American joint committee on cancer (UICC/AJCC) stage group distribution showed striking differences between the USA and our cohort; stage I–II in 55.3 per cent versus 8.9 per cent and stage IV in 25.4 per cent versus 60.3 per cent of the patients in

TABLE V

MEDIAN SURVIVAL TIME (IN DAYS): SITE AND MODALITY-WISE IN CURATIVELY TREATED PATIENTS

Factor	Median Survival (days)	$\chi^2$ ( $p$ value)	HR (95% CI)
Site			
Oral	631	–	1.0
Oropharynx	381	0.969	0.92 (0.73–1.17)
Hypopharynx	516	0.969	1.05 (0.75–1.33)
Larynx	1015	0.001	0.59 (0.45–0.77)
Nose and PNS	336	0.146	1.29 (0.91–1.83)
Nasopharynx	508	0.420	0.83 (0.53–1.30)
Others	Not reached	–	–
Overall	532	–	–
Sex			
Male	532	–	1.0
Female	508	0.974	1.20 (0.97–1.49)
Modality			
Surgical+RT	1544	–	1.0
RT	427	0.001	3.86 (2.92–5.11)
Other	508	0.001	2.67 (1.96–3.64)

PNS = paranasal sinuses; RT = radiotherapy

TABLE VI  
COMPARISON OF PATIENT, DISEASE AND TREATMENT CHARACTERISTICS BETWEEN NCDB (USA), CANADA (KINGSTON), NORWAY (OSLO)  
AND DELHI

Characteristics	NCDB (1985–1994)	Canada (1985–1997)	Norway (1983–1995)	Delhi (1996–1998)
Total patients	295 022	640	1740	2167
Males	67%	73%	77%	85%
Females	33%	27%	23%	15%
Median age (yrs)	>60	63.7	64.2	55
Site (%)				
Oral	17.6	25.9	32.6	18.3
Oropharynx	12.3	18.9	13.1	32.4
Larynx	20.8	37.1	36.9	19.8
Hypopharynx	4.3	8.4	8.2	13.8
Nasopharynx and PNS	5.6	5.2	6.8	8.5
Histology (%)				
Squamous cell cancer	55.8	All	All	90.9
Adenocarcinoma	19.4	–	–	2.6
Lymphoma	15.1	–	–	1.7
Stage-grouping (%)				
I	36.1	–	–	2.6
II	19.2	–	–	6.9
III	16.5	–	–	22.0
IV	25.4	–	–	65.0
Unknown	27.3	–	–	3.5
Treatment (%)				
Surgery only	32.4	16.3	6.1	2.7
RT only	18.9	69.5	46.1	64.6
Surgery and RT	25.0	6.7	35.5	17.6
Chemoradiotherapy	6.0	0.5	5.7	11.2
Other	10.0	0.3	3.7	3.9
Median follow up (in months)	37 (1985–1989) 10 (1990–1994)	37.0	39.6	17.5 (curative) 11.6 (overall)

NCDB = National Cancer Data Base; PNS = paranasal sinuses; RT = radiotherapy

the National Cancer Data Base and the Delhi data, respectively. The other published report from India had also shown stage III–IV presentation in more than 70 per cent.<sup>7</sup> Instead of stage-grouping, Hall *et al.*<sup>4</sup> analysed the Kingston and Oslo series of squamous cell carcinomas of the head and neck as T and N category distributions. These category-wise distributions between Kingston, Oslo, and Delhi were respectively found to be as follows:

T<sub>1</sub>–T<sub>2</sub> = 66.8 per cent versus 51.2 per cent versus 19.8 per cent;

T<sub>3</sub> = 15.3 per cent versus 11.5 per cent versus 39 per cent;

T<sub>4</sub> = 17.9 per cent versus 37.3 per cent versus 41.2 per cent;

N<sub>0</sub>–N<sub>1</sub> = 83.6 per cent versus 78.9 per cent versus 53.9 per cent;

N<sub>2</sub> = 12.8 per cent versus 15.4 per cent versus 35.7 per cent;

and N<sub>3</sub> = 3.6 per cent versus 5.7 per cent versus 10.4 per cent.

Thus a larger proportion of head and neck cancer patients in India present with advanced primary and nodal stages, when single modality treatment is unlikely to achieve cure and often resectability is not feasible. A higher percentage of patients had

oropharyngeal tumours (32.4 per cent) in our series, which are unsuitable for surgical resection.

The stage-group, T and N category presentations in our data are directly reflected by the pre-treatment decisions taken in the joint clinic. Objectives of the care process were planned as curative in 53 per cent, palliative in 35 per cent and supportive care in 12 per cent of our patients (Table II). Surgery alone (32.4 per cent versus 2.7 per cent) or combined surgery and radiotherapy (25 per cent versus 17.6 per cent) were delivered to larger percentages in the USA than could be feasible in this series because of more advanced presentation. The proportion of our patients selected for radiotherapy alone were similar to the Canadian data (Table VI). However, treatment intents were not reported in the earlier two reports,<sup>4,5</sup> whereas 339 (46.9 per cent) out of 722 patients who received irradiation in this series were treated with palliative intent (Table III). The other published literature from India had presented their hospital or population-based data on the treated head and neck cancer patients without any reference to the treatment decision, intent of therapy or patient compliance.<sup>7–9</sup>

The overall median follow up of 11.6 months in this series (1996–1998) is similar to the 10-month period in the later 1990–1994 series from the National Cancer Ddata Base, USA.<sup>5</sup> However, the three-year

survival of 49 per cent achieved in curative patients in this analysis is much lower than the 60 per cent or more five-year survivorships seen in the USA, Canada and Norway.<sup>4,5</sup> Surprisingly, the results of treatments, based on different treatment policies between Canada and Norway, were statistically equal in the two studied populations.<sup>4</sup> Similar observations were made that differences in treatment practices between Canada and USA did not affect the overall survival.<sup>6</sup> Thus better outcomes have been observed in western head and neck cancer patients.<sup>1,16</sup> Vikram<sup>14</sup> has extended two persuasive explanations for the lower survival results from the Indian subcontinent, *firstly* the assumption based upon treatment outcomes among head and neck cancer patients in the developed countries may not apply to patients in developing countries, and *secondly* the biology and radiation sensitivity of Indian subcontinent patients may be different from European and North American patients.

The World Health Organization's national cancer control programmes' guidelines recommend as outcome measures a 30 per cent reduction in targeted advanced cancers and a five-year survival of 30 per cent in treated cancer patients.<sup>17</sup> The cancer patients in India come to the hospitals from long distances, face difficulties as regards finance and the long duration of stay needed for cancer-directed treatments and often do not comprehend the care process or benefit of therapy. Comprehensive cancer centres offering all facilities from diagnosis to treatments and follow-up care are geographically widely located. Thus it becomes imperative for the health care delivery system to ensure that a patient diagnosed with cancer is receiving the prescribed treatment. Although service guidance and clinical audit have been recognized to improve head and neck cancer care,<sup>3,12</sup> the social profile of Indian patients, unlike in the western countries, pose problems in keeping track of the patients through any means of feedback and communication.

- **This study analyses 2167 patients with head and neck cancer treated in a tertiary referral centre in India**
- **Head and neck cancer accounted for 17 per cent of cancers presenting to the institute. Three-year survival was 49 per cent in patients treated with the intention to cure**
- **Patient non-compliance was a significant problem. An issue which needs to be addressed in developing countries if optimum survival rates are to be achieved**

The strength of this study is its candid analysis of initial treatment intent and modality-wise decisions, and subsequent patient compliance in a large unselected group of head and neck cancer patients. This audit showed that after the treatment decision/option was discussed and recorded by the joint head and neck cancer clinic team, 38 per cent of

curatively planned and 46 per cent of palliative patients did not comply with the cancer-directed therapy at our institution. These patients had spent five days to 49 days waiting between investigation and diagnosis before registration at the clinic. The high percentages of patient non-compliance to follow prescribed treatment is highlighted in this audit. Not only do we need to look into the comparative treatment outcomes in the treated patients between the western countries<sup>4-6</sup> and India,<sup>7-9</sup> but it would be of greater interest and of value for developing countries' health care systems to improve patient compliance when access to optimal cancer care is sparse. This issue of low adherence to recommended therapy has been studied for several other chronic diseases e.g. diabetes, depression, tuberculosis, hypertension and HIV/AIDS, but not so much in relation to cancer-directed treatments.<sup>18,19</sup> As efficacious treatments and improved outcomes are available for many cancers, low patient compliance can undermine the effectiveness of the care system. Interactional dynamics related to provider-patient communication, patients' beliefs, social and cultural norms will all need attention.<sup>20</sup> The drawback of this audit is that these aspects were not analysed, nor was it intended to obtain feedback whether these patients received treatment elsewhere.

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