ASSESSMENT OF THE EFFICACY OF AN ANTI-TOBACCO COMMUNITY EDUCATION PROGRAMME

The project entitled "The Assessment of the Efficacy of an Anti-Tobacco Community Education Programme" commenced from 1st February 1986 through funding from the Indian Council of Medical Research. The project aimed at evaluating the effectiveness of education on the harmful effects of tobacco in a community that was imparted such a measure compared to two other similar communities in the same district which did not have the benefit of such education. The key variable that acts as the indicator for the success or failure of the education programme would be the number of individuals that have quit the tobacco habit in the experimental area vis-a-vis the control area. To a lesser extent, the number of persons who may have reduced the tobacco habit is another measure but could be subjective and therefore bias the actual results.

Kolar district in Karnataka was chosen for the study, because of the ease of operation from Bangalore by virtue of the district being nearer and expected high prevalence of the Tobacco habit in the area.

Three areas Dibbur, Malur and Gudiband comprising 117, 136 and 120 villages respectively and with total populations of 60447, 64202, 48878 (1981 census) were chosen on the basis of fair degree of comparability of the health education and socio-economic infrastructure. Nonetheless certain differences in the number of schools and degree of exposure to urban areas persist.

Dibbur was chosen as the Experimental Area, Malur and Gudiband as Control-I and Control-II Areas respectively. Apart from the two main objectives the other secondary objectives were to train Primary Health Centre personnel to provide health education for prevention of oral cancer mainly by anti-tobacco programme and to train them to inspect the oral cavity, identify lesions and classify them into referable and non-referable categories and to design, pretest, produce and utilise suitable health education material for oral cancer prevention.

The Plan was to have base line survey of the tobacco habit of the population of a random sample of villages in the 3 areas. This was followed by imparting education on the harmful effects of tobacco through the health workers of the primary health centre in only the villages covered under the experimental area of Dibbur. After an interval of 2 years, a repeat survey (first repeat survey) of the tobacco habit was done in the 3 areas.

The results of the first repeat survey were indeed encouraging. The survey showed a 43% reduction in the habit in the experimental area, 0.3% in control area I and 0% in control area II. The corresponding reduction figures for smoking and chewing in men were 17% and 25% in experimental area, 0.2% and 0% in control area I and 0% in control area II.

A final survey of the population in the villages in the three areas was done during 1991-92. The survey showed a 37.8% reduction in the experimental area and 0% in control area I and II. The corresponding reduction figures for smoking and chewing in men were 20.6% and 16.1% in experimental area, 0% in control area I and II. The difference in reduction of the tobacco habit was not as pronounced in all age groups combined as it is noticed in the first repeat survey. However, the reduction was higher than first repeat survey in the younger age group.

The results of the Anti Tobacco Community Education Programme indicate that there has been a substantial reduction in the uptake of the tobacco habit particularly among women in the area where health education was imparted. In men also a reduction is seen but this is not as pronounced as in women. The degree of reduction in the habit is not as much between first contd..., pg. 3
FROM EXECUTIVE EDITOR'S DESK

It is my proud privilege to be the Executive Editor from this issue of ONCOSCOPE. I hope I will be able to fulfill the aspirations with which this bulletin has been envisioned.

The present Editorial Board wishes to thank Dr. B. K. Mohanti for adeptly managing as Executive Editor of ONCOSCOPE until now. We wish him success in his new post at IRCH, New Delhi. We also thank Mrs. Kamala, outgoing member of the Editorial Board, for her contribution to the ONCOSCOPE.

The present issue has four lead articles, including the one invited article by Prof. F. Badellino from Genova, who visited our institute this year. Three new columns have been added, one listing publications of KIMO, other showing screening report of voluntary blood donors for AIDS and another defining the terminologies used in oncology.

Dr. Kumara Swamy

IN THIS ISSUE . . .

* Editorials 1 & 2
* Invited Article
  Radio-immuno-guided surgery for intraoperative detection and staging of solid tumours 3
* Original Contribution
  Seroconversion following Immunization Genetically Engineered Hepatitis 'B' Vaccine (Engerix-B) 6
* Report of HIV Screening of Voluntary Blood Donors 7
* Department Profile
  Hospital Cancer Registry of KIMO at a Glance 8
* INDO-Japanese Symposium
  Radiomodifiers in the management of cancer 10
* New Facility at KIMO
  Computerised Treatment Planning system for radiotherapy 11
* Terminology
* KIMO Bibliography
  Publications from July 1991 to July 1992 14
* Case Report
  Myxoma of the Maxilla 15
The package of health education materials were to impart knowledge to change misconceptions and negative attitude about the harmful effects of tobacco, through uniform and standardised health education. The materials utilised to educate literates were handbills and folders. The identification card and photo album were used for interpersonal education. The portable and exhibition panels and films on chewing and smoking were used to educate groups or large gatherings. Among all the educational devices used for the anti-tobacco community education programme the response appeared to be best in order of importance for film on the harmful effects of chewing and smoking (61.0% quit, 69% reduced), photo album (14% quit, 12% reduced) and identity card (7.0% quit, 8.0% reduced). The other items used for education had some effect but were not as marked.

N. Anantha, M.D., D.M.R.E.

INVITED ARTICLE

RADIO-IMMUNO-GUIDED SURGERY FOR INTRAOPERATIVE DETECTION AND STAGING OF SOLID TUMOURS

F. Badellino M.D., P. I Percivale M.D., S. Bartolomeo M.D., P. Meszaros M.D. and S. Bertoglio M.D.
Divisione di Oncologia Chirurgica (D.O.C.), Instituto Nazionale Per la Ricerca sul Cancro - IST GENOVA

The authors report their experience on Radio-immuno-guided Surgery by using radiolabelled Monoclonal Antibodies (MAB) and an intraoperative hand-held gamma detecting probe (Neoprobe 1000) for intraoperative detection and staging of colorectal cancer. The use of this new technique was introduced at our institution in 1988 following a well established training and cooperation with the Dept. of Surgical Oncology of the Ohio State University.

Intraoperative radio-immuno-detection has been carried out in order to define the diagnostic resolution power of the method, study the patterns of bio-distribution of single MABs and define the possibility to identify subclinical tumor masses which could be overlooked during surgical procedures. Inasmuch our efforts have been pointed out to overcome to some criticisms of the original procedure itself.

Since December 1988 we have performed 96 surgical procedures using two different MABs; table No. 1 summarizes our experience:

<table>
<thead>
<tr>
<th>Tumor Site</th>
<th>MAB B72.3 ¹²⁵I (anti TAG 72)</th>
<th>MAB FO23C5 ¹²⁵I (anti CEA)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLORECTAL</td>
<td>54*</td>
<td>28</td>
<td>82</td>
</tr>
<tr>
<td>BREAST</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>OVARY</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

* This series accounts for 14 patients from the Division of Surgical Oncology IST Genova and 40 patients from the Departments of Surgery at the University of Milano and Varese; the overall 54 patients results have been included in a common phase II clinical trial concluded by December 1990 and in Press in the Br. J. Surg.
RESULTS

1 - Colorectal Cancer: MAb B72.3 125I (anti TAG 72)
The series included 32 patients resected for primary colorectal cancer and 22 for recurrent tumors. No adverse reaction was observed after the preoperative injection of 1 mg B72.3 radiolabeled with 1.5 mCi of 125I. The interval from preoperative injection and surgery was 21.12 ± 4.8 and 24.2 ± 7.8 for primary and recurrent colorectal cancers respectively.

One-hundred-thirty-three suspected tumor sites were intraoperatively recognized by radio-immuno-guided surgery; 72 in patients with primary tumors and 61 in patients operated for recurrences. Out of the 133 sites evaluated 130 were confirmed to be neoplastic tissue by pathological examination while 3 of them were enlarged non-cancerous lymph-nodes expressing TAG 72 antigen (False positive detections).

Table No. 2 summarizes the obtained results in primary colorectal cancer procedures:

<table>
<thead>
<tr>
<th>Site</th>
<th>True Pos.</th>
<th>False Pos.</th>
<th>False Neg. Tag Ag +</th>
<th>False Neg. Tag Ag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Cancer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dukes A+B</td>
<td>3/16 (18.7%)</td>
<td>0</td>
<td>3/16 (18.7%)</td>
<td>10/16 (62.5%)</td>
</tr>
<tr>
<td>Dukes C+D</td>
<td>13/18 (72.7%)</td>
<td>0</td>
<td>3/16 (16.6%)</td>
<td>2/18 (11.1%)</td>
</tr>
<tr>
<td>Liver Metastases</td>
<td>13/20 (65%)</td>
<td>0</td>
<td>4/20 (20%)</td>
<td>3/20 (15%)</td>
</tr>
<tr>
<td>Lymph-Node Metastases</td>
<td>9/13 (69.23%)</td>
<td>2/13 (15.38%)</td>
<td>2/13 (15.38%)</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>5/5 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>43/72 (59.72%)</td>
<td>2/72 (2.77%)</td>
<td>12/2 (16.66%)</td>
<td>15/72 (20.83%)</td>
</tr>
</tbody>
</table>

Table No. 3 analyses the results obtained in recurrent colorectal cancer surgical procedures.

Positive predictive value of this technique by using B72.3 MAb and upper sensitivity level were respectively 95.5% and 61% for primary colorectal cancer and 98% and 83% in recurrent tumors.

Finally we evaluated the surgical decision making changes based on the use of this technique. Globally radio-immuno-guided surgery modified the surgical approach in 7/54 (12.9%) of patients; in particular in 1/23 (3%) of patients with primary colorectal cancer and in 6/22 (27.2%) of patients with recurrences. 3 of the latter 6 patients underwent laparotomy only on the basis of high CEA levels increase, and an unknown site of recurrence was located in the perianastomotic serosal coat.

<table>
<thead>
<tr>
<th>Site</th>
<th>True Pos.</th>
<th>False Pos.</th>
<th>False Neg. Tag Ag +</th>
<th>False Neg. Tag Ag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Recurrence</td>
<td>16/18 (88.8%)</td>
<td>0</td>
<td>2/18 (11.2%)</td>
<td>0</td>
</tr>
<tr>
<td>Liver Metastases</td>
<td>20/25 (80%)</td>
<td>0</td>
<td>5/25 (20%)</td>
<td>0</td>
</tr>
<tr>
<td>Lymph-Node Metastases</td>
<td>10/13 (76.9%)</td>
<td>1/13 (8%)</td>
<td>2/13 (15.38%)</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>4/5 (80%)</td>
<td>0</td>
<td>1/5 (20%)</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>50/61 (81.96%)</td>
<td>1/61 (1.63%)</td>
<td>10/61 (16.33%)</td>
<td>0</td>
</tr>
</tbody>
</table>

MAb FO23C5 125I (FAB'2 anti-CEA)
A phase I study was carried on in a series of 28 patients in order to assess the possible use of fragmented MAbs possibly more specific than B72.3. Being proteins with a lower molecular weight they should be expected to target the tumor sites in a shorter period of time and clearing faster from the blood pool. Both these specific features should allow surgeons to operate patients in a shorter period of time from the preoperative injection. The aims of this phase I study was in fact to define the best interval from the injection to surgery when using FAB'2 anti CEA MAb. Inasmuch, we wanted to assess the patterns of bio-distribution of the antibody for its possible future use for therapy. The study design provided with series of 6 patients operated at different intervals from the antibody injection: 6, 9, 12 and 15 days.

TABLE No. 4 summarizes the clinical and biological obtained results.
TABLE No. 4

<table>
<thead>
<tr>
<th>Interval to Surgery</th>
<th>6 days</th>
<th>9 days</th>
<th>12 days</th>
<th>15 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Rigs Positive Detections</td>
<td>5/7</td>
<td>18/22</td>
<td>4/6</td>
<td>2/7</td>
</tr>
<tr>
<td>- Rigs Negative Detections</td>
<td>2/7</td>
<td>4/22</td>
<td>2/6</td>
<td>5/7</td>
</tr>
<tr>
<td>- False Positive Detections</td>
<td>(29.6%)</td>
<td>(18.2%)</td>
<td>(33.3%)</td>
<td>(71.4%)</td>
</tr>
<tr>
<td>- Intraoperative Tumor/NT Ratios (Counts 2&quot;)</td>
<td>2.42</td>
<td>3.89</td>
<td>3.47</td>
<td>1.45</td>
</tr>
<tr>
<td>- Radiolocalization Index</td>
<td>6.28</td>
<td>7.01</td>
<td>3.49</td>
<td>1.93</td>
</tr>
<tr>
<td>- Mean Radioactivity Normal TISS. (cpm/0.1g)</td>
<td>651.9</td>
<td>251.0</td>
<td>204.2</td>
<td>58.97</td>
</tr>
<tr>
<td>- Mean Radioactivity Tumor TISS. (cpm/0.1g)</td>
<td>1473.8</td>
<td>1730.5</td>
<td>708.6</td>
<td>179.6</td>
</tr>
<tr>
<td>- Whole Blood Pool Radioactivity (cpm/0.1ml)</td>
<td>1711.1</td>
<td>892.1</td>
<td>698.2</td>
<td>163.3</td>
</tr>
</tbody>
</table>

2 - Breast and Ovarian Cancer

The studies on these two tumors are at present ongoing and available data are not enough to be summarised in a prospective manner.

Conclusions

Our experience with radioimmuno guided surgery has been satisfactory at least for its use in colorectal cancers. Both MAb B72.3 and MAb F023C5 have shown positive results in intraoperatively detecting colorectal cancers and their metastases. The use of fragmented MAb's appears to be highly interesting especially because it allows to perform surgery 9 days after the preoperative injection of the MAb. Inasmuch anti-CEA MAb appears to target in a better manner primary tumors even in clinical stage I-II.

At present we believe that the better results shown for recurrent cancers may also be obtained for primary ones when testing and eventually using more specific monoclonal antibodies.

We also believe that, by using different radioisotopes than $^{125}$I, a comparison with preoperative immuno scintigraphy may be of some help on increasing the diagnostic definition power of radioimmuno guided surgery.

References

- S. Bertoglio, F. Schonone, M. Gipponi, F. Caffiero, L. Moracchi, P. Percivale; Pharmacokinetics of B 82,3 I-125 MAb for colorectal cancer Immunodetection by means of radioimmunoguided (RIGS™) surgery. Journal Experimental Clinical Cancer Research 8(3); 123, 1989 (Suppl.)
SEROCONVERSION FOLLOWING IMMUNIZATION WITH GENETICALLY ENGINEERED HEPATITIS 'B' VACCINE (ENGEXIX-B).

Department of Microbiology

Introduction:

In India, primary hepatocellular carcinoma & cirrhosis are largely due to hepatitis B virus (HBV) infection (1) & thousands die of it every year. The only practical approach to preventing this infection is by vaccination. Various Hepatitis B virus (HBV) vaccines have been made available. The plasma derived vaccines are reported to be safe, effective & immunogenic (2,3). However, for reasons such as scarcity, cost, fear of contaminants in human plasma & an imaginary AIDS scare, acceptance of this has been poor especially in developing countries. The synthetic yeast derived recombinant hepatitis B vaccine has reactogenicity & immunogenicity comparable to those of plasma derived vaccines (4).

The risk of exposure to Hepatitis B virus amongst hospital staff is known to be high. One of the means of offering protection against such exposures is through vaccination. With a view to protect the hospital staff of KIMIO against HBV infection, a vaccination programme using a genetically engineered Hepatitis B vaccine was initiated in a phasic manner. Serological reaction among some vaccines was studied in our laboratory. This communication gives the seroconversion obtained in 50 such healthy hospital personnel who received a yeast derived recombinant HBV vaccine (Engerix-B).

Materials & Methods:

Fifty volunteers comprising of 35 males and 15 females were selected for the study. The group consisted of 4 doctors, 24 laboratory personnel, and 21 other staff associated with patient care. They were all negative for Hepatitis B surface antigen (HBs Ag) and were in good physical health.

Four doses of the Smith Kline Biological's recombinant yeast derived Hepatitis B vaccine (Engerix-B) were administered to each subject at 0, 1, 2, & 12 months. Each dose was of 20 g and was given by the intramuscular injection in the deltoid muscle.

A total of 7 blood samples were collected from each volunteer. The sampling interval selected was based on the convenience of the laboratory. Each subject was bled at 0, 1, 2, 3, 4, 8, 19, 30 and 36 months. Tests on serial samples from all the volunteers could not be carried out partly because of noncompliance and partly because of loss of samples during storage. Hence the numbers analysed varied at each interval.

Method Anti HBs ELISA:

This test was standardised in our laboratory. The optimum concentration of antigen (purified recombinant HBs Ag obtained from the Principals Viz., Smith Kline Biologicals, Belgium) to be coated onto the Nunc strips (Nunc Inter Med A/S Nunc, Post Box 280, Kamstrup OK 4000 Roskilde, Denmark) was derived at by a checker board titration using the International Reference anti HBs serum (obtained from Central Laboratory of the Netherlands, Red Cross Blood Transfusion service, Amsterdam). Serum samples were tested in duplicate at a dilution of 1:200. Four concentrations of the international reference serum, viz., 10, 40, 80, and 150 ml were included as standards. Appropriate positive and negative controls and blanks were also put up. The conjugate used was horse reddish peroxidase labelled anti human IgG raised in goats (KPL, USA) diluted 1:5,000. The substrate and chromogen used were hydrogen peroxide and ABTS (Sigms A 1888) respectively.

A standard curve was plotted and the concentration of the serum read off the graph. Any value >10 ml U/ml was taken as seropositive. (5)

Results: Only 40/50 chosen completed the full dose schedule of the vaccine. However, amongst the rest, 8 missed the booster dose, 1 the 3rd dose while one of them missed both the 3rd dose and the booster dose. The details of the antibody response is shown in the table.

Discussion:

Gill and coworkers (6), have reported a 3% positivity of antibody to Hepatitis B surface antigen in resident doctors. Our results showed that 2% (1/50) of the staff had an evidence of past exposure to Hepatitis B Virus. Following vaccination, seroconversion occurred in 42.5% (after 2 doses), 72.5% and 80.95% (after 3 doses) and 92.5% and 95.1% (after the booster dose). However, all the vaccinees appeared to be successfully immunized when fresh samples from them were tested at 36 months. To the best of our knowledge, similar studies on the Indian scene using genetically engi-
neered HB vaccine with the same dose schedule are not available for comparison.

Conclusion:

Our results indicate a successful seroconversion following vaccination with the yeast derived recombinant Hepatitis B vaccine. This may go a long way in protecting individuals from exposure to Hepatitis B virus infection.

Acknowledgements:

We are thankful to Eskayel Limited for financial support, and to Mr. Muralikumar C., Mr. Abdul Haleem, Mr. Bhat H.S. and Mrs. Shallet Esther for their technical assistance. We are also thankful to Mr. Jayaramu M. for typing the manuscript.

Table: Sero-conversion following vaccination with Engerix 'B'

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Sampling Time</th>
<th>Months post Vaccination</th>
<th>% Sero positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre immune</td>
<td>0</td>
<td>2% (50)</td>
</tr>
<tr>
<td>2</td>
<td>1 month after 2nd dose</td>
<td>2</td>
<td>42.6% (40)</td>
</tr>
<tr>
<td>3</td>
<td>1 month after 3rd dose</td>
<td>3</td>
<td>72.5% (40)</td>
</tr>
<tr>
<td>4</td>
<td>6 months after 3rd dose</td>
<td>8</td>
<td>93.96% (42)</td>
</tr>
<tr>
<td>5</td>
<td>7 months after the booster dose</td>
<td>10</td>
<td>92.5% (40)</td>
</tr>
<tr>
<td>6</td>
<td>18 months after booster dose</td>
<td>30</td>
<td>96.1% (41)</td>
</tr>
<tr>
<td>7</td>
<td>24 months after booster dose</td>
<td>36</td>
<td>100% (41)</td>
</tr>
</tbody>
</table>

Numbers in parenthesis indicate sample size.

References:


DEPARTMENT PROFILE

HOSPITAL CANCER REGISTRY OF KIMIO AT A GLANCE
K. Ramachandra Reddy, Chief Biostatistician & Head, Department of Hospital Cancer Registry

The Hospital Cancer Registry at Kidwai Memorial Institute of Oncology has been in existence since 1980. As part of its expansion activity of the National Cancer Registry Programme, the Indian Council of Medical Research included the registry under its network project from the year 1985 and supported it with a token grant every year.

The main task of the Registry is maintaining detailed information of patients registered at this institute and to carry out Statistical analyses. The strength of the hospital cancer registry data is its more reliable numerators. These include the numbers of patients and details regarding their cancers, extent of disease and its management.

Kidwai Memorial Institute of Oncology is a referral cancer centre. In view of the facilities available, about 70 percent of the patients are referred by various medical institutions and private practitioners. Over 10,000 new cases are registered annually and about 1.85 lakh follow-up patients visits are recorded each year. About 19 percent of the patients registered annually are from the adjacent States of Andhra Pradesh, Tamil Nadu, Maharashtra and Kerala. 30 percent of the new registered cases are from Bangalore Urban Agglomeration which amounts to about 70 percent of cases to the existing population based cancer registry. Annually over 4900 patients are being treated as in patients and over 1500 cases are surgically operated. About 300 patients are given radiotherapy treatment daily.

Data Collection/Cleaning:

Kidwai Memorial Institute of Oncology is a comprehensive Centre for cancer research/treatment and is a referral institution. Normally about 70% of the patients come with a referral slip either with definitive diagnosis or at least with suspicious diagnosis of cancer. These patients on their first presentation will be given an OPD slip and are referred to the General Duty Doctor(s) who after careful examination of the patient clinically and based on the referral letters, recommend the preparation of a case file and refer them to a particular out patient department, depending on site of tumour for further investigations/management procedures. Once a case file is prepared, the registry staff collects Socio-demographic information from each patient in a pre-divided proforma, before sending the patient to any outpatient department. Later, the medical personnel complete the rest of the information on medical items through verification from the case records. The data so collected is entered on to the computer and standard consistency checks are performed using a special software programme for cleaning the data of a cancer registry. The most frequent cross checks carried out were, inconsistencies between extent of disease v/s primary site, previous treatment, morphology v/s diagnostic method codes, treated and treatment not accepted codes, and treatment status discharge status codes. Once the data is cleaned statistical analysis is carried out and the required tabulations are generated.

Incident Cases:

During the year 1989, a total number of 10,546 patients were registered. Among these, 7350 patients (69.7%) were diagnosed to have cancer which includes 495 cases as late registrations. Excluding late registrations, 6871 cases were considered as incident cases for analysis. Out of 6871 cases, 3151 were males and 3720 were females with a sex ratio of 1:1.2. More than one primary site of cancer was diagnosed in 16 cases. 1534 patients (14.5%) were diagnosed to have benign lesions and 1320 (12.5%) patients were dropped out before confirmation of diagnosis. Keeping the 1984 incident cases as base, the percentage of increase in incident cases in 1989 (figure-1). Among the incident cases of 6871, 909 patients (13.2%) received treatment prior to registration at the reporting institution (KMIO) and 5962 patients (86.8%) were diagnosed primarily at KMIO. The Hospital Cancer Registry provided about 70% of the cases to the existing population based cancer registry.

Figure - 1
INCIDENT CASES BY SEX
Hospital Cancer Registry

<table>
<thead>
<tr>
<th>Cases in Thousands</th>
</tr>
</thead>
<tbody>
<tr>
<td>4000</td>
</tr>
</tbody>
</table>

[Graph showing incidence cases by sex]

MALE

FEMALE
Diagnostic Methods:

The most valid basis of diagnosis for confirmation of cancer as a high order of reliability was microscopic verification and this was done in 93.6% of the cases (6432 patients) including cytology and bone marrow examinations. For 166 patients (2.4%) diagnosis was based on X-Ray and other imaging techniques and 185 patients (2.7%) were diagnosed clinically.

Leading Sites:

Among males, cancer of the oesophagus was the most predominant site of cancer and formed 11.1% of all cancers in males followed by cancers of Hypopharynx (10.6%), Lung (7.6%), Tongue (6.6%) and Lymphomas (6.2%).

Among females, cancer of the cervix uteri was the first leading site with 40.2% of all cancers in females followed by cancer of breast (11.6%), other mouth (9.7%), Oesophagus (7.3%) and Gum (3.1%). The ten leading sites of cancers is shown in figure 2.

Paediatric Cancers (0-14 years):

Paediatric cancers accounted for 5.3 percent (167/3151) of all cancers in males and 2.2 percent (81/3720) of all cancers in females, and together for both sexes it formed 3.6% (248/6871). Leukaemias and Lymphomas were most common, both in males and females, and they formed 35% and 16% of the total paediatric cancers respectively, followed by brain & Bone tumours.

Head & Neck Cancers:

Of the total incident cases of 6871, 21% (1414/6871) of the cases were Head and Neck cancers. The proportion of these cancers in males was higher and formed 31% (967/3151) of the total male cancers compared to 13% (447/3720) in females. Among the male Head & Neck Cancers, Pharyngeal Cancers were predominant: Oropharynx (141/3151) - 35%, Hypopharynx - 34%, than Larynx - 17.7% and oral cavity - 12.9%. On the contrary among females, oral cavity cancers were most predominant and formed 80% of the total female Head and Neck cancers.

Tobacco Related Cancers:

Tobacco related cancers accounted for 53% (1690/3151) of all cancers in males and 24% (908/3720) of all cancers in females. Together for both sexes, these cancers accounted for 38% (2598/6871).

Treatment Status at KMO:

Out of the 3151 male cancer patients, 1640 patients (52.1%) received complete treatment as advised to them. 1101 (34.9%) patients did not receive any cancer directed treatment either due to advanced disease and/or dropped out before planning/commencement of treatment and/or would have advised only symptomatic treatment. 5% (158) of the patients did not accept the treatment advised to them and 7.8% (247) of patients have received incomplete treatment. Among females also, the same proportion (52.8%, 1964/3720) of patients had received complete treatment, 30% of patients (1116) did not receive any treatment. 4.6% (171 patients) did not accept the treatment advised and 12% (448 patients) received incomplete treatment.
Follow up:
As an important function of a hospital cancer registry, the registry sends follow up letters to all the patients except for proved benign tumours and maintains this information separately. In view of about 60% of the patients attending the Institute are from rural areas of the State/adjacent areas, where the literacy level is relatively low, the percentage of patients responding to the follow up letters is less compared to urban patients, and ranges from 40-50%. The other reasons for not responding to follow up letters are migrant agriculture labourers, dwelling in relatives' or friends' homes temporarily with no permanent residential address.

Acknowledgements:
I gratefully acknowledge the support and coordination given to me by my staff, and the guidance of Dr. N. Anantha, Project Chief, in the smooth functioning of the registry.

SYMPOSIUM

An Indo-Japanese symposium on "Radiomodifiers in the management of cancer" was held at KIMIO on 27-28 February 1992. The programme was convened by Prof. N. Anantha, Director, KIMIO and was sponsored by ICMR, New Delhi and Ministry of Health, Govt. of India. Dr. T. Sugahara, Emeritus Professor of Kyoto University, Japan, headed the team of eminent doctors and scientists from Japan and Indian team was lead by Prof. P.N. Srivastava, Jawaharlal Nehru University, New Delhi. Dr. C.N.R. Rao, Director, Indian Institute of Science, Bangalore inaugurated the symposium. Scientists, doctors and oncologists from Karnataka, Andhra Pradesh and Tamil Nadu participated in the proceedings.

The topics discussed in the programme were: epidemiology of cancer; radiological research; confirmation radiotherapy; radio-modifiers such as phenothiazines, 2-DG, pentozyline and RP-170; hyperthermia with respect to hydralazine, animal studies and clinical experience.

The meeting concluded that all regional cancer centres be provided with modalities found experimentally useful, with close interaction between radio-biologists and radiation oncologists to enable clinical applications at an early stage, collaborating with Japanese scientists who have extensive radiobiological experience.

SAFETY OF FOOD IRRADIATION

A World Health Organisation panel that met last month has concluded that food irradiated under existing good manufacturing practices (GMP) will not undergo changes in composition such that it becomes a toxicological hazard, nor will there be changes in the microflora that migh increase microbiological risk for consumers.

However, the panel advised that changes in content of vitamins known to be sensitive to Irradiation should be monitored.

The LANCET, Vol. 339 June 6, 1992, PP 1409
Role of Treatment planning system in Radiotherapy:

External beam radiotherapy using ionising radiation from radioisotope machines and medical electron accelerators is a well established technique for the treatment of cancer, especially for deep seated locations in the human body. The technique is mainly to achieve maximum dose delivery to the target volume containing the tumor, at the same time restrict the dose to the surrounding normal tissues as minimum as possible. In brachytherapy, the same goal is achieved by positioning the radioactive sealed sources in the form of tubes, needles or wires in close proximity to the tumor or by embedding them in the tumor itself, protecting the adjoining normal tissues because of rapid fall off of radiation dose. Therefore, radiotherapy treatment planning involves marking of treatment volumes correctly and positioning radiation beam portals accurately. It is well established that the dose delivery to the target volume should be achieved within 5% limits so as to expect clinically accepted results. Computers have been used in radiotherapy since 1970's for routine treatment planning to avoid subjective errors involved in manual methods and try out many therapy plans using different beam loadings / angulations in multiple portals etc., so as to select the most desirable plan. Therefore the task of the radiation treatment planning system (TPS) is to calculate the dose distribution along different planes (cross sections) of the body. With the advent of modern imaging systems such as X-ray computerised tomography (CT), Magnetic Resonance Imaging (MRI) and Positron emission tomography (PET) it had been possible to feed the patient contours (selected reference section of the patient's body containing the tumor) and various normal tissue contours (organs) inside the body very accurately. These imaging modalities also help the radiotherapists and medical physicists to incorporate corrections for beam path lengths through different tissue heterogeneities such as lung, bones, cartilages etc. These structures would perturb the beams, especially high energy electrons. In the recent past, systems capable of multi-dimensional display of dose distributions are available, which could be well appreciated in the background CT or MR image.

Details of planning system at KIMO:

Kidwai Memorial Institute of Oncology had installed a CT interfaced TPS as a time sharing system with a Diagnostic CT machine (Somotom) known as Somados, during 1985. The software used in the system was of an older generation and since 1990 the system is not in working condition. The commissioning of High energy electron accelerator Clinac-180, increase in the number of intracavitary/interstitial Cs-137 sources applications, and starting of Iridium-192 procedures in the Institute necessitated a stand alone treatment planning system for our department. Utilising the grants from the Government of India, a treatment planning system 'Radplan' (M/S TSG Integrations Ltd., New Delhi) was installed during May 1992. The total cost of the system which included 1) External beam therapy terminal 2) Brachytherapy terminal and 3) CT images evaluation and Planning terminal, was Rs. 17.84 lakhs. Compatibility of the 8 inch floppy information from our CT machine is being worked out by the supplier presently. Both of these terminals are in routine use in the department from June, 1992. The configuration of the installed system is shown in Fig. 1

Functional Aspects:

a) External beam Therapy terminal:

Planning of stationary, rotational techniques using photons (Cobalt-60, 6MV, 18MV), stationary techniques with electron beams, special plans involving blocked beams and display of information on adjacent planes
etc. are possible. Manual contour entry is done through a 'digitizer' or 'mouse'. Documentation of final plan is achieved through a 'colour' 132 column printer or by a graphic plotter. The entire software/hardware is indigeneous and the system appears to be user friendly. Treatment planning is performed by the computer, for which it uses a set of 'look up' tables stored by the computer for each radiation beam, and a set of algorithms for actual function requested by the physicist. The beam therapy terminal is installed in the LINAC complex, with its own un-interrupted power supply (UPS). Fig. 2 shows a radiation dose distribution for a bi-centric arc technique to treat a patient with Ca cervix.

b) Brachytherapy terminal:

The other terminal is installed in the brachytherapy wing. This is a stand alone system, installed with an

| Isodose distribution for intracavitary Cs-137 application for Ca. Cervix |
| The point A dose rate with 5 x 36 mCi and 2x58 mCi is 122.0 cGy/h. |

UPS and does not affect the routine work at the former terminal. Information of the type of applicator, anatomical structures, points of interest for dose prescription, critical organs etc. could be fed to the system by a medical physicist/dosimetrist using the orthogonal X-ray films. The optimal brachytherapy plan could then be finalised by the radiotherapist by running a dummy run in the case of implantation or plot out the actual dose distribution for the already completed implantation procedure. For after-loading intracavitary procedure, variety of source/pellet combinations could be tried out so as to facilitate acceptable dose distribution. Figs. 3 and 4 show the

| Isodose distribution for external beam radiotherapy with bi-lateral arc technique using Co-60 radiations, 120° arcs centred 2 cm from mid-point laterally gives elliptical distribution covering the tumor volume. |

| Isodose distribution for an interstitial Implant for Ca-Buccal mucosa. Doserates are shown in cGy/h. Activity used 2x4.6 mCi and 3x3.52 mCi Cs-137 needles. |

dose distributions obtained from the TPS, for an intracavitary Selectron application (Ca. cervix) and a tongue implant with Americsham Cs-137 needles.

Need for Treatment planning system to improve patient care:

In India, only about 15-20 radiotherapy centres have computerised TPS. A treatment planning system is a basic necessity of any radiotherapy centre. However not many centres have this system because of the prohibitive cost of the imported models. Since 1985 indigenous models came into existence and these are available at a cost of about Rs.8
lakhs. Availability of this equipment would facilitate better use of the cobalt machines for radical radiotherapy by proper treatment planning and help post-graduate teaching centres in demonstrating optimising therapy plans. The software part of the TPS is quite significant and therefore this department is working for the generation of software to meet the demands.

**TERMINOLOGY**

1. MEDLARS (Medical Literature Analysis And Retrieval System): It is at the National Library of Medicines, Comprising more than 28 bibliographic databases covering the fields of Medicine, Nursing, Dentistry, veterinary medicine and the preclinical sciences. This database is the computerised counterpart of Index Medicus International, Nursing Index and the Index to Dental Literature.

2. MEDLINE: MEDLARS available intracavitally from a remote terminal to users is known as MEDLINE. ONLINE: searching is performed on computer terminal connected by a telephone line to the host computer at National Library of Medicine, Bethesda, which has the MEDLARS database.

3. CD-ROM (Compact Disk Read Only Memory): CD-ROM is a tiny little disc of 4.72 inch diameter, weighing 20 gms. It can store upto 3,000,000 pages of information. The drive can be connected to a PC/AT.

4. CANCER-CD: Single silver platter compact disc, containing cancer related bibliographic records.

5. ONCODISC: provides unlimited and integrated access to Physician Data Query (PDQ), having data and comprehensive cancer treatment database. PDQ contains valuable data about cancer prognosis, staging and treatment (cancer information file) and physicians and organizations active in cancer research and treatment (Directory file), all readily accessible through a variety of channels.

6. CANCERLIT: Cancer lit is NCI's extensive database for published cancer literature. Can retrieve facts from more than 80,000 citations and abstracts, selected from some 4,000 different sources: biomedical journals, proceedings, books, reports, doctoral thesis - many of them found in no other computer database.

---

**COUNTING BIRDS, BEES AND NCDs**

Why is it that we know more about the number of sandhill cranes, monarch butterflies, sperm whales, and bison, than we know about the number of new heart attacks, cancers, injuries, and asthma attacks? It is because population biologists are better able to "count" animals than we are able to "count" diseases. Perhaps it is time to start counting non-communicable diseases (NCDs) in much the same manner as wildlife biologists count sandhill cranes.

We need to break away from the traditional public-health approaches to the counting of NCDs - surveillance, registries, and death certificates. These systems are too inaccurate (surveillance), too costly (population based registries), or too late (death certificates) for the broad monitoring of changing patterns. Perhaps we should begin to use population biology methods such as capture-mark-recapture?

In the capture-mark-recapture method wildlife are caught, tagged, and released and later recaptured. By this means one can estimate the number of fish in Loch Ness, for example, on the basis of the proportion of the sample recaptured. Wildlife biologists recognised long ago that it would be impossible to count every fish by capturing them all and that the identification of all the fish is not necessary to an accurate estimate of their numbers. Complete enumeration of every incidence case is not necessary to accurate incidence rates. National census offices are just beginning to accept this and public health should so do too.

New NCDs can be identified from several rosters (e.g., hospitals, families, self-report, physicians, pharmacies, or ambulances). Unique identifiers serve as "tags" (e.g., health insurance or social security number or name). By noting how many people appear in different "captures" (rosters), an accurate estimate of the total number of cases in the community can be derived, rather as is done with tagging fish.

It is surprising that the capture-mark-recapture methods have not made greater inroads in medicine for many doctors have made use of it in other settings - for example, counting red blood cells by extraction, labelling, injection, and re-extraction is an accepted procedure. To count every red cell would be too costly and is not needed for accurate estimates.

Ronald E. Laporte et al
1. An interpretation of cytogenetic profiles in sporadic Wilms' tumor cases receiving preoperative cytoreductive chemotherapy
   M. Augustus, T.S. Sundareshan, D.C. Doval, B. Padmanabhan, K. S. Gepinath and M. K. Bhargava
   The Cancer Journal
   Vol. 4 No. 6  PP 397-399  1991

2. The Time dose fractionation (TDF) relationship in the radiotherapy of carcinoma of the cervix
   K. Swamy, S. Supe, M. Udaya Kumar, N. Vishwanathan and N. Anantha
   Strahlenther. Onkol.
   Vol. 176  PP 603-607  1991

3. Unusual Splenic Metastasis from Oesophageal cancer
   Krishna Murthy S., P.S. Prabhakaran, Sameer R. Rao and Rekha V. Kumar
   Indian Journal of Cancer
   Vol. 28  PP 81-83  1991

4. Influence of Brachytherapy Dose Rate on Complications in the Treatment of Carcinoma of the Uterine Cervix
   Kumara Swamy, Vishwanath, D.S. Mohan and Bellappa M.S.
   Endocurie therapy Hyperthermia Oncology
   Vol. 7  PP 171-177  1991

5. Post Laryngectomy Rehabilitation : The case for planned Early Speech Therapy
   Premalatha B. Subbarao, Ashok M. Shenoy, Nanjundappa and Prof. N. Anantha
   Indian Journal of Cancer
   Vol. 28  PP 218-222  1991

6. Rehabilitation after Ablative Laryngeal Surgery
   Premalatha B.S., Ashok M. Shenoy and M. K. Bhargava
   Pakistan Journal of Otologyngology
   Vol. 7  PP 91-94  1991

7. Results of Carcinoma Cervix Treated with Intracavity Radiotherapy
   K. Swamy, N. Vishwanathan, D.S. Mohan and M.S. Bellappa.
   Journal of Clinical Radiotherapy Oncology
   Vol. 6 No. 1  PP 7-11  1991

8. Paracentric inv(3)(q21q26) in Acute Myeloblastic leukemia (M2) with Normal Thrombopoiesis.
   Cancer Genet Cyogenet
   Vol. 57  PP 1001-1003  1991

9. Trisomy 4 and 9 in a case of AML - M2 Type
   T.S. Sundareshan, M. Krishnamurthi and T. C. Yasha.
   Cancer Genet Cyogenet
   Vol. 55  PP 273-275  1991

10. Acceptance Tests for Clinac - 1800 - A Dual photon Medical Linear Accelerator.
    Anil K. Sharma, Sanjay S. Supe and S.L. Keshava
    AMPI Medical physics Bulletin
    Vol. 16  PP 1-9  1991

11. Predicting Early and Late reactions of Selectron LDR Treatments.
    S.S. Supe, K.T. Bhowmick and S.J. Supe
    AMPI Medical physics Bulletin
    Vol. 16  PP 7-17  1991

12. Tables for the Normalisation of Times Dose Fractranation factors for normal and Tumor Tissues
    S.S. Supe and Anil K. Sharma.
    AMPI Medical physics Bulletin
    Vol. 16  PP 21-27  1991

13. Application of Radiation Efect Models in combined External and Intracavitary Radiotherapy of Carcinoma of the Uterine Cervix
    Kumara Swamy, Sanjay S. Supe, Manoor Udaya Kumar, Nanjundappa Viswanathan and Naranappa Anantha
    Acta Oncologica
    Vol. 31 No. 4  PP 443-448  1992

14. Cystosarcoma Phyllodes : Diagnosis by Fine Needle Aspiration Cytology
    Clementina Rama Rao, Naresh K. Narasimhamurthy, Kalavathy Jaganathan, Geethasree Mukherjee, and Diganta Hazarika.
    Acta Cytologica
    Vol. 36 No. 2  PP 203-207  1992
CASE REPORT

MYXOMA OF THE MAXILLA

Rekha V. Kumar, D. Hazarika, G. Mukherjee, A. M. Shenoy, Nanjundappa, Departments of Pathology & Head and Neck.

Introduction

Myxomas of the jaw bones are encountered rarely, although the jaws are the commonest sites where these tumours are seen in bone. Presented herein is a case of myxoma of the maxilla which recurred eight years after initial surgery.

Case Report

A 20-year-old female presented in March 1984 with a history of swelling of the right cheek for one year for which she had undergone surgery elsewhere six months earlier. The swelling had recurred two months before she presented here, and was associated with pain. On examination, a tumour was seen arising from the right maxillary antrum. It was seen in the oral cavity as a large firm lesion which extended from the second incisor tooth to the premolar area; the overlying mucosa was not ulcerated. There were no palpable cervical lymphnodes. The clinical impression was that of a recurrent fibrous dysplasia of the right maxilla.

A needle biopsy of the mass was performed and tissue diagnosis of myxoma was sent out. The tumor was subsequently excised through the Caldwell-Luc approach. At surgery, complete destruction of the anterior wall of the maxillary sinus was noted. The diagnosis of myxoma was reaffirmed on histopathological examination of the excised mass.

The patient returned to this institute in Oct. 1991, with a complaint of recurrent swelling for one year. Radiography revealed an opacity in the right maxilla extending to the nasal cavity. A computerised tomogram of the skull showed evidence of a contrast enhancing soft tissue mass lesion in the right upper alveolar region. There was destruction of the right upper teeth as well as the right maxillary bone and floor of the maxillary sinus. Fine needle aspiration of the tumour revealed recurrent myxoma. A partial maxillectomy was performed.

The resected specimen measured 6 x 3.8 x 2 cms. A partially encapsulated tumour measuring 4 x 5 x 3
oms, was seen; the cut surface had a translucent, shiny, grayish appearance. The surgical margins were grossly free. On microscopic examination, a fairly well circumscribed lesion was seen underlying the epithelium. The matrix was abundant and myxoid (showing Alcian blue positivity), with relatively few cells; these were either stellate or spindle shaped. Other areas were more cellular with predominantly spindle cells. There was no significant mitotic activity (Fig.) expanding radiolucent lesions which may have a multi-locular pattern. There is no distinctive appearance characteristic of this tumour on radiography. The tumour is often extensive at the time of presentation. Invasion of the antrum occurs frequently in lesions of the maxilla.

Histologically, other lesions which may show myxoid areas must be excluded - these include Schwann cell tumours, well differentiated myxoid liposarcomas, embryonal rhabdomyosarcomas and various fibroblastic and chondroid neoplasms.

Although this is a benign neoplasm, it frequently exhibits insidious local invasion, making its complete removal difficult, a problem augmented by the loose, gelatinous nature of the tissue itself. The treatment of choice is surgical excision. Recurrence is common in a high percent of cases, especially if the tumour has been removed by curettage rather than by excision. Adequate, sufficiently radical surgery at the very onset will avoid subsequent, more major surgical procedures. The prognosis is good as myxomas do not metastasise, despite unpredictable recurrences if incompletely excised. The tumour is not sensitive to radiotherapy.

References

1. FuYS, Parzin KH: Non-epithelial tumours of the nose, paranasal sinuses and nasopharynx, only six were classified as myxoma. These are tumours with very loose cellular connective tissue containing little collagen and large amounts of intercellular substance which is rich in hyaluronic acid. Since similar lesions are rare in other bones and since some oral myxomas contain tiny epithelial remnants, this tumour is assumed by many to be of odontogenic origin, apparently arising from the mesenchymal portion of the tooth germ. Others favour a fibroblastic derivation for this tumour.


