

## SEMON LECTURE

### CURRENT THOUGHTS ON THE MANAGEMENT OF CARCINOMA OF THE TONGUE

MR Shabeen, Ladies + Gentlemen

I would first like to express my deep appreciation of the honour granted to me by the University of London and the Board of the Semon Lecture Trust in inviting me to give this 57th Semon Lecture. The list of eminent lecturers in the past gave cause for some personal trepidation, not least the fact that only one of them - David Patey - was, like myself, a general surgeon.

#### SLIDE - Sir Felix Semon

Who we commemorate this evening

The life of Sir Felix Semon reads like an adventure story. He was born in Danzig in 1849 and sent to school in Berlin. He entered medicine not from choice but by a process of elimination. His father's business failed; his music was not quite good enough for this to be his profession; his religion debarred him from high office in the Law. He studied first in Heidelberg and then Berlin during which time, among other things, he came under the influence of the great Virchow, fought three duels and served in the second regiment of the Prussian Uhlan guards as an N.C.O. in the Franco-Prussian war. He qualified in 1874 and with a career in University medicine once again precluded, he pursued his postgraduate studies first in Vienna, where he ~~watched the opera~~ <sup>met</sup> Billroth and was befriended by Brahms; then ~~to~~ Paris and finally London.

London medicine impressed him most favourably, <sup>including the</sup> ~~not least the~~ fact that its students were distributed over eleven schools rather than concentrated into one single faculty, to the great benefit of their teaching. He was not, however, ~~so~~ favourably impressed with the profession's stubborn adherence to rooted tradition and especially its antipathy to laryngology to which he was to devote his major energies. I need hardly remind you of his work on the innervation of the larynx, his less well known contribution to studies on the function of the thyroid gland, his activities in the foundation of societies and journals for laryngology, his interest in the illness of Crown Prince Frederick of Prussia and his glitteringly successful practice, his patients including Mr. Gladstone and Queen Victoria.

*beginnings of the*

Semon witnessed and contributed to the <sup>A</sup> rational surgical treatment of laryngeal cancer. My brief today is the management of cancer of the tongue. No less than four of the last seven <sup>Semon</sup> lectures were relevant to today's theme: Professor Bocca on Neck Dissection, Mr. Peter Clifford on Chemotherapy, and Mr. Ian McGregor and Professor Gordon Snow each on problems of reconstructive surgery in cancer of the oral cavity. It can be seen that the field of head and neck oncology is indeed a meeting point for many specialities and provides great opportunity for inter-disciplinary co-operation to the benefit of the patient.

Numerically the predominant malignant new growth of the tongue is squamous cell carcinoma which accounts for more than 95% of tongue cancer. I shall not today consider the small residue

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which includes salivary adenocarcinoma, lymphoma, soft tissue sarcoma and metastases. The incidence of tongue cancer in this country has fallen over the last fifty years and the sex ratio dramatically altered from 10 males to one female to 1.5 to one.

#### SLIDE - INCIDENCE

These changes are accounted for almost entirely by a fall in the incidence of the disease in men; the female incidence remains more or less constant. There is considerable geographical variation, ~~in the incidence and sex distribution of tongue cancer and in the site of the cancer within the tongue.~~ Thus, while in Europe and the U.S.A., the oral portion is affected approximately three times as commonly as the pharyngeal, this ratio is reversed in India where cancer of the pharyngeal tongue predominates. This anatomical distinction is important because symptomatology, stage at presentation, routes of spread and, therefore, management and prognosis are different for the two portions. Posterior third growths lie out of sight and early symptoms of discomfort and soreness of the throat are easily overlooked. They tend to infiltrate deeply and often cross the midline or spread beyond the confines of the tongue by the time of first attendance. They are, on the whole, less well differentiated than carcinomas of the oral portion and are associated with a higher rate of lymph node involvement which is more often bilateral than for the oral portion.

#### SLIDE - FRAZELL AND LUCAS

Frazell and Lucas in an analysis of more than one thousand patients found that a lump in the neck was second only to local pain and discomfort as the presenting symptom for posterior third growths in contrast to the oral tongue where an enlarged node is a relatively infrequent herald of the disease.

~~ANATOMICAL DIAGRAM OF THE TONGUE~~

~~The potential routes of local spread are shown in this diagram.~~

Cancers of the oral tongue can <sup>locally</sup> spread from their usual origin on the lateral edge deeply into the musculature and towards the midline where they <sup>first bulge and</sup> ultimately penetrate the median raphe. They may involve the floor of the mouth and mandible or **infiltrate** posteriorly to reach the posterior third so that in larger growths the precise site of origin cannot always be determined. **Disease** can spread along the styloglossus muscle to the base of the skull and pterygoid region. Posterior third carcinomas can invade deeply into the root of the tongue, laterally to the fauces and posteriorly to the pre-epiglottic space. Accurate clinical assessment of the primary tumour is helped by E.U.A. especially for more posteriorly situated lesions.

#### SLIDE - LYMPH NODES

Lymph from the tongue drains to the submental, submandibular and upper deep cervical nodes. Note that the most posterior group ~~many~~ lies close to the upper end of the accessory nerve.

Note also that there is a route which can skip the horizontal chain to pass directly to the jugular chain of jugulo-omohyoid nodes. Dye studies

5.

in the living subject show ipsilateral spread ~~spread~~ except for the tip of the tongue, <sup>which drains bilaterally.</sup> ~~an uncommon site for cancer.~~ Otherwise contralateral drainage occurs only in the presence of chronic obstruction to normal flow as might follow gross ipsilateral metastases, or neck dissection. In Frazell and Lucas<sup>o</sup> study only 3% of patients showed contralateral metastases alone at first <sup>clinical</sup> examination. ~~On the other hand,~~ <sup>But</sup> Once the primary lesion has reached the midline, about one patient in four is at risk of developing contralateral deposits. The clinical assessment of cervical nodes is unreliable. A number of independent studies is in agreement with the finding that approximately one third of clinically negative necks contain metastases while one third of clinically suspicious necks are histologically clear.

Dr. Richard Carter (~~of the Institute of Cancer Research and Royal Marsden Hospital (Sutton)~~) has redrawn our attention to the importance of <sup>infiltration</sup> ~~spread~~ along the perineural spaces in head and neck squamous cancer, especially in larger tumours and particularly for the tongue.

#### SLIDE - PERINEURAL SPACE

This route provides an easy pathway for spread at a distance from the obvious macroscopic tumour and may well be responsible for some failures of local control.

Bloodstream spread, once regarded as rare, is now being more commonly documented, no doubt due to better control of advanced primary disease which allows these patients to live long enough to manifest their distant metastases.

6.

This pathological prologue, which is essential to the planning of management ~~and comparison of the various~~ is summarised in ~~the~~ various staging schemes <sup>in this country</sup> ~~This is~~ the TNM classification of the U.I.C.C.

SLIDE - T CATEGORY

Categories T<sub>1</sub> - T<sub>3</sub> records

Note that <sup>the</sup> surface area of the lesion <sup>but</sup> does not take into account its depth of penetration so that infiltrating tumours <sup>apart from</sup> tend to be understaged compared with the exophytic type.

the gross T<sub>4</sub> group

~~(Clinical assessment is often made more accurate by an E.U.A.)~~

SLIDE - N CATEGORY

The American joint staging scheme though similar for the 'T' categories is ~~different~~ different as far as 'N' status goes, which makes for some ~~confusion~~ confusion in comparing European and American data.

Both however <sup>come together</sup> agree on staging.

I: T<sub>1</sub>  
II: T<sub>2</sub>

III: T<sub>3</sub> or any T N<sub>1</sub>

IV: T<sub>4</sub> or any T N<sub>2,3</sub>

SLIDE - STAGE

There is general agreement

~~It should be noted~~ that increasing 'T' stage is accompanied by an increase in the incidence of node involvement and that the single most important determinant of prognosis is the node status, which is reflected in this staging scheme.

TREATMENT

In discussing treatment it is conventional and convenient to separate the oral, anterior two thirds of the tongue from the pharyngeal, posterior third, the two being divided by the V-

7.

shaped line of the circumvallate papillae. Many of the considerations to be discussed are, however, common to both sites.

### CARCINOMA OF THE ORAL TONGUE

Squamous carcinoma of the oral cavity in general and the <sup>oral</sup> tongue in particular are both radio-sensitive and amenable to surgical excision. Not surprisingly, therefore, the choice of treatment has been, and still is, the subject of debate. Seen in historical perspective the earliest methods were surgical and in Semon's own time Billroth, whose name I have mentioned, Butlin - Semon's associate and friend - and Trotter, who removed ~~the~~ Sir Felix's appendix in 1920, just a year before his death, all made major contributions to this field. Mortality and morbidity were considerable and the advent of radiotherapy, especially the development of interstitial irradiation in the 20's and 30's, .. exploited to such good effect by my own late chief and mentor, <sup>at Westminster Hospital</sup> Sir Stanford Cade, largely displaced surgery from the scene, certainly in this country. The last thirty years has witnessed a resurgence of surgical enthusiasm thanks to advances in anaesthesia and intensive care, <sup>the use of</sup> antibiotics; and remarkable progress in the field of reconstruction. Radiotherapy has advanced in parallel - super voltage X-ray machinery and cobalt sources, refinements in interstitial techniques, and developments in radio-biology which have led to investigation into hyperbaric oxygen, fast neutrons and radio-sensitizers. Most recently, we have also to consider the place of the third major arm in cancer treatment, cytotoxic therapy. In reviewing the literature, there is little to choose between surgery and

irradiation in terms of cure for the small primary carcinoma i.e. T1 and <sup>some</sup> T2. Powerful advocates can be cited for each approach — Generally, but not exclusively, surgeons on behalf of surgery and radiotherapists for irradiation, <sup>but there is no real argument.</sup> Primary radiation therapy with surgical salvage <sup>in reserve</sup> for the radiation failure <sup>has</sup> ~~in reserve has also~~ been the favoured policy in the two hospitals I have been <sup>personally</sup> associated with - Westminster Hospital and lately the Royal Marsden.)

Apart from the particular enthusiasm of the practitioner who first sees the patient, the selection of method for the individual case <sup>may be personal</sup> is influenced by a number of factors, some <sup>factors</sup> related to the patient and others to his tumour. In the elderly, ~~the~~ surgical operation is more easily tolerated than an interstitial implant. On the other hand, external radiation is appropriate for the patient who is unfit for <sup>general</sup> anaesthesia. There is an argument for avoiding irradiation in the young, who may live long enough to develop late post-radiation complications, and second or more independent primary carcinomas for which radiotherapy might be better held in reserve. Carcinomas which are <sup>deeply</sup> infiltrating ~~rather than exophytic~~ <sup>perhaps</sup> are better managed by surgery as also, though rare in this site, is the verrucous carcinoma. This variety apart, the degree of histological differentiation on biopsy does not help the choice of treatment. Surgery is preferred for carcinomas arising on the basis of grossly dysplastic field change, <sup>or the now exceedingly rare chronic syphilitic glossitis.</sup>

SLIDE - CARCINOMA IN LEUKOPLAKIA

9.

Carcinoma in leukoplakia is better excised together with the abnormal mucosa, which may require resurfacing with split skin.

Carcinoma of the tip of the tongue -

SLIDE - CARCINOMA OF THE TIP

- is best resected because of the technical difficulties of radiotherapy. ~~whether by implant or external beam~~ Surgery is absolutely indicated for irradiation failure of which this is, not surprisingly, an example -

RADIATION TECHNIQUE

When radiation is selected as the primary treatment for ~~the~~ small to intermediate sized lesions of the oral tongue, interstitial implantation still holds pride of place, either as the sole method or to top up a wider external field <sup>to include the neck.</sup> For interstitial use radium needles are giving way to iridium wire sources which have the advantages of less bulk, greater flexibility and comfort, and can be afterloaded to minimize exposure of personnel.

SLIDES - IRIDIUM SET

SLIDE - X-ray OF IRIDIUM IN SITU

SLIDE - RADIUM NEEDLES IN SITU

SURGERY

<sup>for these smaller lesions is performed intra-orally and</sup>  
~~Surgical excision of small lesions can be readily carried out personally and~~ should follow the orthodox precepts of three dimensional clearance of at least one and preferably two centimetres. ~~For small lesions~~ <sup>the resultant functional defect is</sup> slight and rapidly compensated.

10.

SLIDE - 3D CLEARANCE

contains an

↑ Error + emphasises failure to clear inferiorly which is avoided by drawing proposed limits of ext with Bonney's blue

SLIDE - EXCISION

The wound <sup>may be</sup> closed by

~~the~~ sutured in the usual way in the unirradiated tongue or after interstitial implantation where the dose falls off rapidly away from the immediate treatment zone.

SLIDE - SUTURE

But after <sup>high dose</sup> external irradiation it is more comfortable, and safer from the point of view of wound breakdown and secondary haemorrhage, ~~rather~~ to leave ~~the~~ it wound open; the raw muscle epithelidizes completely in a few weeks.

SLIDES - EPITHELIALISATIONTHE LYMPH NODES

1974 #2/2/2/2

; formal hemiglasectomy not always necessary. Functional value of leaving tip, cancer free writing.

It is quite artificial to separate the management of the primary tongue carcinoma from that of the cervical nodes; I <sup>still have</sup> do so solely for convenience of description. While the chance of node involvement rises with T stage, histological ~~node involvement~~ <sup>deposits</sup> have been recorded in up to 20% of clinical T1/NO tumours so that the neck deserves the closest attention, even in these apparently most favourable cases. For metastatic nodes large enough to be palpable the most reliable means of control is by neck dissection, ~~and where surgery is used as the sole modality~~ <sup>customarily</sup> the classical radical operation with sacrifice of the sterno-mastoid muscle <sup>accessory nerve</sup> and internal jugular vein, ~~has no proved rival~~. It is appropriate at this point to consider lesser types of neck dissection ~~and~~ here one must return once more to surgical pathology.

SLIDE - LINDBERG (1972) - ORAL TONGUE

These figures from Lindberg refer to the clinical status of previously untreated patients on first presentation. ~~Nodes were bilateral in 11% of cases.~~ This clinical study ~~which~~ <sup>and</sup> ~~is~~ paralleled ~~by~~ pathological studies such as those of McKelvie show ~~immediately~~ the shortcomings of the suprahyoid dissection, which is unreliable either for control of disease, or bearing in mind the skip routes particularly in more anterior lesions, even for staging. And, focusing on the striking incidence of high jugular node involvement <sup>as well as</sup> ~~and~~ other pathological features, McKelvie has questioned the -

SLIDE - REPEAT NODE ANATOMY

- wisdom of the Bocca type of functional neck dissection which spares the <sup>muscle,</sup> vein and accessory nerve, ~~notwithstanding the very low incidence of posterior triangle nodes around the accessory in the lower part of its course.~~ <sup>On the other hand, however, clinical</sup> Studies such as those of Jesse and his colleagues on oral cavity cancer suggest that modified dissection carries no greater risk of failure than the classical operation, but ~~his~~ <sup>his</sup> node positive patients received supplementary irradiation and the tongue was not separately analysed. Further exploration of the place of functional <sup>& modified</sup> dissections, ~~and in certain circumstances the supraomohyoid dissection~~ <sup>combined with</sup> ~~combined with lower neck~~ irradiation is warranted because loss of the accessory nerve can be very disabling, especially in heavy manual workers. Sacrifice of the internal jugular vein and sternomastoid are far less important. Modified operations are still, however, experimental and the Crile procedure remains

in general the safest choice.

While surgery is the most reliable method of control for grossly metastatic neck disease, the belief ~~held in former years that~~

~~that~~ such disease <sup>is</sup> ~~was~~ unresponsive to irradiation is untrue though,

as Henk among others has shown, smaller nodes are more amenable to sterilisation than larger ones. I should also remind you

that local recurrence following radical neck ~~dis~~section is not

rare. Elliot Strong recorded the considerable figure of 28.7% <sup>recurrence,</sup>

even excluding those patients with reactivation at the primary

site. The chances of surgical failure in the neck are highest

when the nodes show capsular invasion or are multiple. Strong's

improved figures for pre-operative radiotherapy, 17.6% versus

28.7% and subsequently Barkley's figures for post-operative

neck irradiation support the combined approach <sup>in this respect.</sup> ~~with radiation~~

~~prior to neck dissection when nodes are clinically positive,~~

~~or following dissection when pathology shows perhaps more than~~

~~a single small node.~~

The controversy surrounding the management of the clinically

negative neck, whether to watch or treat electively, remains

<sup>the</sup> ~~un~~solved. There are no prospective randomised studies but the

sum total of the many retrospective surveys shows no clear

advantage for either approach. There is one situation, however,

where elective dissection is safer and this is for the patient

who, for one reason or another, is not available for frequent

and regular follow-up <sup>particularly in the critical first two years.</sup> Metastatic squamous nodes can blow

up and become fixed within a frighteningly short space of time.

The risk of metastases is greater for larger T<sub>0</sub> tumours but <sup>still</sup> exists even for the T<sub>1</sub> lesion.

13.

Up to 10 years ago elective treatment of <sup>the</sup> NO case meant neck dissection. Fletcher and Million among others have, however, since produced data suggesting that irradiation to a dose equivalent to <sup>(50 Grays)</sup> 5,000 rads in five weeks will reduce the incidence of subsequent node development to an extremely small level, and if both sides are irradiated will ~~also~~ virtually eliminate contra-lateral disease. These findings have, however, not been borne out by the Manchester trial presented by Pointon so the final word on this matter had not yet been said.

For the larger primary <sup>tongue</sup> lesion the results of either surgery or irradiation as single modalities are less satisfactory than the 90% or <sup>greater</sup> control rate obtainable in T1 tumours. <sup>Some claim an advantage for</sup> White and Byers, <sup>for example,</sup> in a retrospective but apparently matched study, found surgery superior to irradiation as the initial treatment of T2, T3 and T4 lesions (in respect both of the primary result and the ultimate fate after secondary salvage procedures in the event of primary <sup>surgical</sup> failure). Their figures for primary control by either method fall off sharply in the T3 and T4 group, which show a combined failure rate of 50% at the primary site. This <sup>is in line with the conclusion</sup> matches closely the findings of Spiro and Strong that 4 cms is the prognostic watershed; they achieved control <sup>in the tongue</sup> in more than 80% of patients by surgery alone for lesions less than 4 cms in diameter but the local failure rate was greater than 50% for lesions <sup>larger</sup> ~~greater~~ than <sup>this diameter</sup> 4 cms.

with 96% control of the primary site in T2 falling to 80% for T3 & 4 combined, but there were only 6 T4 lesions / 152 pts.

Comparison of various series in different countries, and at different times within the same country, are extremely difficult because of the difference in staging conventions, and variations in the statistical expression of results. However, the figures

13 (a)

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Comparison of various ~~series~~ <sup>even</sup> in different countries and at different times within the same country are extremely difficult because of <sup>inconsistencies</sup> ~~differences~~ in staging conventions and variations in the statistical expression of results. However, the figures from radiotherapy centres of comparable excellence to those surgical groups quoted are of <sup>similar</sup> ~~the same~~ order e.g. the Institute Curie achieved a primary tumour control rate of 89% for T1, 87% for T2 and 84% for T3. One must also make reference to Pierquin's unique figure of 95% control in primary lesions of the tongue and floor of mouth up to 4 cms in diameter using iridium implantation. The functional advantage of irradiation over surgery for these larger lesions is obvious. These figures for surgical or radiotherapeutic control at the primary site which I have quoted are, however, not so favourably reflected in survival statistics mainly because of failure in the neck and to a much lesser extent blood borne deposits especially in the N+ patient.

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SLIDE - MOORE AND FLYNN

These curves from Moore and Flynn are broadly representative of the literature and show clearly the influence of stage on survival which is a more important factor than the precise choice of treatment.

SLIDE - SURVIVAL BY STAGE

75-95%

65-75%

35-45%

0-9%

; individual stage breakdown range

Such ~~these~~ data form a <sup>yardstick with</sup> baseline on which the claims of new approaches to treatment <sup>can to some extent</sup> must <sup>be judged</sup> be measured. <sup>NO</sup> par prog of T4 or N2/3.

SURGICAL TRENDS

Regarding surgical technology the scalpel, scissors and diathermy -

needle remain the standard weapons for tongue resection. There <sup>is considerable current</sup> ~~is~~ <sup>also</sup> ~~more~~ <sup>interest in</sup> the use of the laser beam and of the ultra-sonic scalpel, both of which reduce bleeding, ~~but this factor is not a real problem for the experienced surgeon with good~~

~~and effective laser treated patients are said to and the laser is claimed to lessen discomfort and time in hospital,~~

15.

but few units possess one. 15

anaesthesia. More <sup>widely used</sup> popular and of value in selected instances is cryosurgery both in the control of leukoplakia and the management of superficial carcinomas, especially in the frail and elderly as general anaesthesia can be avoided.

SLIDES - BEFORE AND AFTER CRYOSURGERY

: I am grateful to Frank Coffin  
to resection failure 18/12

As regards surgical options I have referred so far to the procedures of intra-oral partial glossectomy and to neck dissection. <sup>Re question asked:-</sup> when both are required, Should these be combined as a classical monobloc operation or may they be performed discontinuously? Spiro and Strong's analysis of the New York Memorial experience indicated that provided the primary tumour could be adequately resected through the open mouth the results of the discontinuous operation were no different from those of resection en bloc.

monobloc operation is, therefore, only necessary when the primary carcinoma extends so close to the floor of the mouth that adequate clearance involves entry into the neck.

SLIDE - COMMANDO DIAGRAM

If the mandible is grossly involved, which is not <sup>that</sup> common in lingual cancer then a standard commando operation <sup>is</sup> necessary.

SLIDE - CA TONGUE + MANDIBLE

SLIDE - COMMANDO SPECIMEN

Here the trend is very much towards flap repair rather than primary mucosal suture for reasons of form, ~~and~~ function and, in the late post-radiation case, introduction of new blood supply.

SLIDE - FOREHEAD FLAP

Of the many flaps available including the new myocutaneous generation, the forehead <sup>though less popular than formerly</sup> remains a reliable work horse, is extremely safe and, with attention to detail, cosmetically acceptable. (R. side)

More recently the temporalis muscle has been used for intraoral reconstruction, following the studies of Paul Bradley, and offers a non-mutilating one stage repair option suited to some patients following composite resection.

SLIDES - TEMPORALIS REPAIR <sup>x4</sup> ; grateful to John Bowman for introduction + use of this slide.

<sup>reconstruction 12<sup>th</sup> day</sup>  
Free flap with microvascular anastomosis rests for the moment with the enthusiast possessed of the required expertise.

~~Don McGregor has recently advocated a free forearm flap whose vessels of supply, the radial, have a wide enough lumen to allow anastomosis with the loupe rather than the microscope, which may well extend its application.~~

It is now appreciated that unless tumour lies in contact with ~~the periosteum~~ the inner table, bone resection is unnecessary and a pull through procedure can be done <sup>if required</sup> through the sub-periosteal plane <sup>since</sup> a cancer does not spread along the <sup>to be noted</sup> sub-periosteal lymphatics).

SLIDE - PULL THROUGH DIAGRAM . Total Excision of oral tongue

SLIDE - PULL THROUGH OPERATION : wide defect of Total needs flap repair in this case the forehead

SLIDES - FOREHEAD REPAIR

An alternative and increasingly popular mandible sparing approach to the tongue, which provides excellent access for more posteriorly placed tumours, especially in the presence of

17.

standing teeth, is by median mandibulotomy.

SLIDE - MEDIAN MANDIBULOTOMY



I have not yet used this approach personally but it, or alternatively more lateral section in the region of the canine as ~~advocated~~ <sup>advocated</sup> by McGregor, are ~~valuable~~ <sup>valuable</sup> additions to the surgical repertoire.

After a partial glossectomy pull through the narrow residual defect is usually readily closed by direct suture <sup>as an alternative to flap repair</sup> and If the patient does not compensate for the resulting tongue tethering <sup>\*</sup> or requires a denture, an epithelial inlay can be done subsequently to restore both mobility and the sulcus.

SLIDES - WILSON

+ 2 1/2 yrs  
+ functional neck  
low insertion

T<sub>2</sub> N<sub>1</sub> tracked by planned pre op DXT  
+ functional neck direction.

Where tumour extends too close to the mandible to permit safe dissection in the sub-periosteal plane, marginal mandibulectomy allows an extended pull through resection which is of special value in the anterior region where mandibular reconstruction after full thickness bone <sup>sacrifice</sup> ~~resection~~ is so troublesome

SLIDE - MARGINAL RESECTION

SLIDES - AL-ABBADI

(+ 2/12)  
Pt of Peter Blackingspp : well at 1 yr

SLIDE - NUTTON

(John Clark)

RADIOTHERAPY

Referring to radiotherapy

The standard ~~radiotherapeutic~~ approaches are, to reiterate, interstitial implantation and external beam therapy. ~~With~~ <sup>sources</sup> ~~super-voltage X-rays or gamma irradiation.~~ For smaller lesions the best results for the primary site have been achieved by interstitial implantation ~~alone and~~ Pierquin's figures ~~of~~ 95% local control ~~remains unsurpassed.~~ Anatomically speaking the radiotherapists' field of action is the same as the surgeons and, depending on the clinical indications, the external beam can be used to treat both tongue and neck.

The use of the simulator, or which the film was taken,

SLIDE - SIMULATOR FILM

: Allows great precision; avoidance of <sup>spinal</sup> cord damage, and ~~etc on~~

The dose may be <sup>wide field</sup> ~~topped up~~ <sup>boosted</sup> over a small volume to the primary site <sup>where poorly oxygenated cells reside</sup> of node mass by reducing the external beam size, or by interstitial implantation.\*

SLIDE - <sup>SHRINKING</sup> CONTRACTING FIELD EXTERNAL BEAM

SLIDE - <sup>SHRINKING</sup> CONTRACTING FIELD IMPLANT

to illustrate the <sup>shrinking</sup> ~~contracting~~ field concept

These slides <sup>in a similar</sup> are modified from Gilbert Fletcher who showed that for this ~~technique~~ technique the more dose given by interstitial irradiation the better the control rates. Radiobiological considerations have opened up <sup>further</sup> avenues of exploration: hyperbaric oxygen; fast neutrons; radio-sensitizers; new fractionations; and recently

19.

combinations of irradiation with local induced hyperthermia. Henk has shown that irradiation in hyperbaric oxygen is advantageous for <sup>control of</sup> larger tumour masses but the technique is cumbersome and not all patients are fit enough to comply. Fast neutrons have not so far proved superior to photon irradiation and the resulting tissue changes pose considerable problems should surgery later be required. Neither altered fractionation nor <sup>the current generation of</sup> radiosensitizers, which are toxic substances, have <sup>yet</sup> led to improved results. <sup>the</sup> preliminary <sup>experience with</sup> results <sup>of</sup> combined hyperthermia/irradiation appears <sup>s</sup> promising but it is far too early to pass judgement.

### CHEMOTHERAPY

The first evidence that chemotherapy could be effective in squamous carcinoma of the head and neck was demonstrated in 1950 by Klopp using intermittent injections of nitrogen mustard into the carotid arterial system to produce high local concentrations of the agent within a tolerable systemic dose range.

### SLIDE - TONGUE FLUORESCENCE

<sup>This</sup> Nitrogen mustard was followed by Methotrexate with folinic acid rescue, Vinblastine and other agents singly or in combination. Impressive tumour regressions are seen but the techniques involved are demanding both on the medical and nursing staff. Accurate placement of the catheter ~~(is essential to success and)~~ usually requires a cervical incision <sup>+</sup> Carotid cannulation <sup>in the neck</sup> carries the risks of ~~anastomotic~~ cerebral embolus, sepsis and secondary haemorrhage; ~~from the neck~~ and <sup>of</sup> thrombosis of the

45'

external <sup>carotid</sup> ~~branch~~ which precludes any possible future use of the valuable, narrow-pedicled forehead flap. In addition, the strict anatomical boundaries of blood supply limit ~~the use of~~ the method to lesions equally strictly confined. The evolution of systemically effective drug regimes has, therefore, been accompanied by a great reduction in the use of the intra-arterial route, (~~for the head and neck as judged ~~from~~ by survey of the literature and personal communication.~~)

SLIDE - CARCINOMA OF TONGUE - SYSTEMIC CHEMOTHERAPY

STAGE IV  
: PRICE HILL (80)  
+ 8/52

The best results of chemotherapy, either intra-arterial or systemic, <sup>have</sup> ~~been~~ in patients who have not had previous surgery or irradiation. If cytotoxic agents are to be used in combination with these other modalities there is general agreement that they should be given at outset.

COMBINED THERAPY

It is in the direction of planned combined therapy that major efforts are being made to improve the poor outlook in stages III and IV disease rather than to follow the sequential policy appropriate to the early stages i.e. pinning the main hopes on the initial modality, surgery or irradiation with second line salvage for primary failure. Considering the relative uncommonness of tongue cancer, the innumerable permutations and combinations of the three major modalities, the variation in radiation technique and timing with respect to surgery, the wide variety of drug regimes and the paucity of evaluable trials/<sup>it</sup> possible to make only the most general observations on the combined.

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approach to oral cavity cancer as a whole, the tongue being the commonest example in this group. Regarding combinations of surgery and radiotherapy, Elliot Strong's classical study on the cervical nodes and the <sup>more recent</sup> data of Terz and others, suggest a <sup>modest</sup> benefit for the planned integrated approach. While pre-operative irradiation is theoretically preferable to post-operative on radiobiological grounds, there is no demonstrable difference in clinical practice as far as tumour control is concerned. Many surgeons prefer to operate first but properly timed surgery following planned pre-operative irradiation presents no special ~~difficulties~~ <sup>mainly the experienced surgeon</sup>, even after full radical dosage. I would ~~also~~ <sup>stress</sup> make the point, at this juncture, that ~~where~~ <sup>is required</sup> major surgical resection <sup>for salvage of the</sup> late radiation failure, the hazards of poor <sup>wound</sup> healing with salivary fistula and carotid rupture have been largely eliminated by the use of vascularised regional flaps in repair <sup>of the mouth</sup> ~~and with the~~ <sup>-together with</sup> correct design of the cervical incision.

### SLIDE - CERVICAL INCISIONS : Avoidance of trifurcations

Pre-operative chemotherapy alone poses no technical operative problems and healing is unimpaired.

Most recently interest has focused on combined chemotherapy/<sup>head and neck cancer</sup> radiation in the initial management of late stage ~~cases~~. Chemotherapy is sometimes administered prior to irradiation and sometimes synchronously. Shaw and Price, in a study of patients at the Royal Marsden Hospital Head and Neck Unit found that two to three courses of the four drug Price Hill A schedule, before

irradiation and/or surgery doubled the two year survival in previously untreated patients, as compared with historical controls. An alternative approach, using synchronous three drug chemotherapy with irradiation has been reported by <sup>Peter</sup> Clifford and his colleagues in a combined Royal Marsden/King's College Hospital study. This <sup>synchronous</sup> treatment produces severe mucosal reactions but no increased late tissue damage and, again, compared with historical ~~work~~ <sup>data</sup>, has led to increased survival and tumour control. Against this, Stell has presented evidence to suggest <sup>possibly</sup> an adverse effect of survival in <sup>his own</sup> ~~a different~~ combined chemotherapy study. Recently reported experience from three centres in the U.S. each using Cis-platinum containing regimes with up to 80% (complete plus partial) ~~response~~ <sup>response</sup> rates, ~~then~~ followed by radiation and/or surgery have shown no survival benefit, again compared with historical data.

~~None of this, of course, denies the palliative value of such treatment, per se or in terms of reducing tumour bulk to a volume where local resection becomes possible.~~ This random selection from the literature allows no clear cut conclusions other than that more randomised trials are needed <sup>to establish the role of chemotherapy in ~~the management of~~ Squamous carcinoma of the head & neck.</sup>

To summarise, surgery alone or radiotherapy alone ~~are~~ <sup>are</sup> equally successful in the management of stages I and II cancer of the oral tongue. ~~above~~ <sup>best buy usually</sup> The ~~attitude~~ <sup>attitude</sup> depends on considerations other than those of cure. <sup>from cosmesis, function, & expediency.</sup> In more advanced stage disease surgery and irradiation should <sup>not complete but rather should</sup> be used in a complementary fashion.

Where the tumour is resectable, primary surgery and post-

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operative irradiation result in the same degree of control as the reverse order. For disease which is initially unresectable, pre-operative radiotherapy with or without chemotherapy, may reduce tumour mass to a point where operation becomes possible. Pre-surgical treatment sometimes produces complete clinical and histological regression of disease. This poses a dilemma for the surgeon: should he follow or depart from the pre-treatment plan to operate in such cases; if he does operate, dare he limit the extent of his surgery? These are, as yet, unresolved questions.

#### CARCINOMA OF THE PHARYNGEAL TONGUE

Carcinoma of the pharyngeal tongue is a far graver disease because it presents at a later stage for reasons already given. Most investigators have found that this adverse prognosis is clearly related to stage rather than to histological grade. Extension across the midline is commonly seen and direct invasion of the root of the tongue and pre-epiglottic space may occur.

#### SLIDE - PHARYNGEAL TONGUE - ROUTES OF INVASION

Lymph node involvement is common, not infrequently bilateral and may involve the posterior triangle.

#### SLIDE - LINDBERG - PHARYNGEAL TONGUE

These considerations have generally dictated and continue to dictate a primarily radiotherapeutic attack and, as might be expected on

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the basis of a predominantly stage III and IV presentation, the overall results are poor, with survival figures ranging from 10 to 26%. ~~That small minority of patients who present with posterior third tumours in stages I and II fare as well as comparably staged patients with carcinoma of the anterior two thirds.~~

Surgical salvage for the post-irradiation failure is occasionally possible but will often require extensive resection of the tongue base, sometimes total glossectomy and often laryngectomy. Sacrifice of the larynx may be necessary by reason of extension of tumour but, <sup>even without direct involvement,</sup> ~~especially~~ in older patients and those with respiratory problems, laryngectomy is often advisable to prevent inundation with secretions. In the younger, fitter patient the larynx can be preserved and reasonable rehabilitation established even with sacrifice of the epiglottis. Effron indeed has reported that swallowing can be re-established after removal of the superior laryngeal nerves, though it is obviously better to preserve these watchdogs of the larynx. There is a trend towards the addition of cricothyroid myotomy in ~~such~~ cases, though there is no real proof that swallowing is improved.

*Award also at this juncture on*

Total glossectomy <sup>with</sup> is an infrequently performed operation. ~~the~~ results in terms of survival are poor, which is implicit in the stage of disease requiring this ~~procedure~~. Pleasant surprises do occur, however, and with intensive support and ~~good~~ patient motivation, rehabilitation is possible. The employment of flap repairs to build up the height of the floor of the mouth is valuable in this respect and the use of a tongue prosthesis attached to a lower denture has been reported to

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aid vowel intelligibility and especially fricative sounds.

Attempts have been made to improve the results of a primarily radiotherapeutic approach for carcinoma of the pharyngeal tongue by planned combined surgery/radiation. Harrold has provided a surgical baseline by a study of 281 patients in various categories including radiation failures with an overall determinate survival of 21%. Using a planned combined approach the Mayo Clinic group report an overall 42% survival though some degree of case selection cannot be excluded. They found that patients operated on by composite resection by a wide lateral approach with either partial jaw resection or lateral mandibulotomy had a lower failure rate than with the more limited approach provided by e.g. lateral pharyngotomy. This echoes my own view which is that these lesser procedures are applicable only to benign tumours and should not be used for malignant disease in this region. The construction of an elective pharyngostome in repair with staged closure was favourably reported by Harrold and more recently advocated as a routine measure by Kothary. This is still a safe technique but should ~~be used~~, be required <sup>less often</sup> with the variety of regional flaps now available.

In summary, the management of carcinoma of the tongue base is the management of advanced disease. Radiotherapy will cure a minority who will be functionally unimpaired, but failure is frequent and seldom salvaged by surgery. A planned combined approach seems to offer a better chance of survival but the patient pays the price of a varying degree of disability, culminating in loss of the larynx. The decision whether to take the soft option and irradiate in the hope of cure or to elect for surgery as an integral part of the plan must depend heavily on patient factors as well as factors related to the tumour.

CONCLUSION

In concluding this review, one is left with the firm impression that the stumbling blocks to successful treatment of lingual cancer remain the same as they were 30 years ago and are concerned principally with the stage of the disease at presentation. We have learned the value of team work but in spite of this the rewards for our concerted efforts are still disappointing in the advanced case. Prevention is possible in many, the epidemiologists suggest, if only the population at risk would moderate the pleasurable aetiological factors known <sup>often</sup> to be operative. I have the impression also that there is a heightened diagnostic awareness on the part of medical and dental practitioners with a resulting increase in the proportion of patients presenting with earlier lesions. But this is not yet enough and the problem of the late stage case remains.

We must, in the meantime, continue to improve our weaponry, to perfect our individual techniques and seek to combine these to the best possible advantage for our patients.