FRIDAY 9th JULY 1999

09.00–11.00 **PLENARY SESSION 13** (Corn Exchange)

CONTROVERSIES IN HEAD AND NECK SURGERY
Chairmen: Professor J. Wilson (UK)
Mr G. Buckley (UK)
Professor A. Jones (UK)

Radical therapy with palliative intent: a physician's fiction.

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Advanced cancer of the upper aerodigestive tract is mutilating, impairs function and is associated with a dismal prognosis irrespective of the therapeutic regimen utilized. Patently, any therapeutic approach will require to not only maximize the chances of cure, but also provide a meaningful quality of life to the survivors and also the inevitable failures.

The eternal dilemma is whether to embark on aggressive therapy with intent to cure no matter how mutilating or offer a less radical approach, hoping for better quality of life but accepting the potential for lower cure rates. This lecture will highlight the pros and cons of each approach and demonstrate that appropriate selected radical surgery can not only increase the chances of cure but, as assessed by newer quality of life instruments, be shown to effectively palliate survivors and failures alike.

How to optimize screening for second primaries, recurrence and metastases.

To scope or scan.

S. M. Graham
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The identification of second primary tumours, metastatic disease, recurrent disease and appropriate tumour stage influences patient treatment and survival in the head and neck cancer population. No clear consensus exists as to the optimal modality of most easily, quickly, accurately and inexpensively identifying such disease. Beyond a detailed head and neck examination, including a flexible fibreoptic assessment of the upper aerodigestive tract and a chest X-ray, further patient investigation varies from surgeon to surgeon. Computed tomography (CT) or magnetic resonance (MRI) scans offer excellent anatomical representations but can be restricted by limitations in sensitivity, specificity, cost, allergy to contrast material and a small rate of patient refusal. Panendoscopy can easily be performed prior to surgery, but may prolong an anaesthetic and have significant cost implications and a small incidence of major complications.

In the hope of clarifying the relative roles and benefits of the 'scope' or 'scan', we have examined our departmental head and neck cancer data base. The data base comprises information on 1,505 head and neck cancer cases seen between 1991 and 1996, extracted from the institutional cancer registry. There were 1,213 patients presenting with index disease and 292 presenting with recurrences. Nearly all patients, except for those with selected T1 lesions, received a CT or MRI scan. For those patients undergoing resection, the treating surgeon was asked whether panendoscopy had been previously performed, was performed in conjunction with the surgery, or was not performed.

Each component of the panendoscopy, laryngoscopy, bronchoscopy, oesophagoscopy and pharyngoscopy was rated as significantly altering or not altering treatment plans. Information with regard to the additional utility of panendoscopy will be presented and reviewed.

Molecular screening.

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It is widely accepted that cancer arises from cells that have undergone multiple genetic alterations followed by clonal expansion. A number of molecular markers have been proposed to reflect the early steps of carcinogenesis in the mucosa of the head and neck. Their potential for the prediction of second primary tumours will be discussed.

It is a great deception for head and neck surgeons that 15–30 per cent of their patients with histopathological evidence of complete excision nevertheless develop local recurrence. This may result from small numbers of cancer cells left behind, undetectable by traditional histopathological methods. Recently the potential of tumour-specific molecular markers such as mutated p53 for the detection of 'occult' tumour cells at surgical margins and the prediction of local recurrences has been demonstrated.

The incidence of distant metastases in patients with head and neck squamous cell carcinoma (HNSCC) has increased because of improved local-regional control. Recently sophisticated methods using HNSCC-associated antigens such as the E48 RT-PCR assay have been developed, which allow detection of rare HNSCC cells in blood and bone-marrow. Their prognostic significance in regards to distant metastases and their potential for monitoring the efficacy of systemic treatment have yet to be assessed.

Functional imaging – a review.

W. L. Wong
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Computed tomography (CT), Magnetic resonance imaging (MR) and ultrasonography (USS) provide unparalleled morphological detail for imaging the extra-cranial head and neck. These techniques, however, cannot reliably and consistently distinguish between active disease, reactive changes and the sequelae of treatment. As a consequence, in some head and neck cancer patients, it is impossible to accurately delineate extent of disease at the primary site, and in others, their nodal status is incorrectly diagnosed. Monitoring response to treatment can be problematic because there is a time lag between tumour response to treatment and morphological changes. Furthermore, in other patients, detection of recurrent disease is delayed until it is too late for salvage treatment.

Functional techniques such as positron emission tomography PET) and 'functional' MR techniques are potentially more accurate at detecting active disease compared with CT, conventional MR and USS. They can play a complimentary role for the assessment of head and neck tumours.

The use of various PET tracers to study different aspects of tumour metabolism will be reviewed. These will include [18F]-fluro-2-deoxy-D-glucose (FDG) for the study of glucose metabolism, C11-methionine for analysis of amino acid turn-over and 18-fluoromisonidazole (FMISO) for evaluation of tumour hypoxia.

The role blood oxygen level dependent contrast (BOLD) and intravenous contrast dynamic MR sequences as techniques for monitoring and assessing tumour oxygenation, blood flow and perfusion will be discussed.

Contact endoscopy.

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The quality of the image the magnifications and the multiperspective view allowed by the rigid endoscopes led us to search for an endoscopic method that could improve, even more, our understanding of the different stages of the mucosal disease.

In Gynaecology, Hamou (1979) had been able to visualize the epithelial cells of the uterus. Inspired by his work we started to develop contact endoscopy to assess the mucosal alterations of the laryngeal mucosa. The quality of the images obtained in the larynx stimulated subsequently the design of specific contact endoscopes for the different territories of the upper aerodigestive tract.

Contact endoscopy brought a new dimension to the observation of the mucosa, allowing 'in vivo' and 'in situ' study of the epithelium. After staining the tissues with methylene blue, the magnifications obtained with contact endoscopy (60 × and 150 ×) allow direct access to the cells and to their characteristics.

The mobility of the contact endoscope permits to map cellular alterations over the entire mucosal surface, documenting normal squamous and ciliated epithelium, to patterns specific for pathology such as chronic inflammation, keratosis, metaplasia, dysplasia, malignant tumours, papilloma lesions. Furthermore this technique also allows the visualization of the dynamic microvascular network of the mucosa.

Future developments of contact endoscopy will increase its diagnostic capabilities and allow improved understanding of several physiopathological processes. Contact endoscopy may add significantly to the study of angiogenesis in inflammation, infection, malignancy and healing.

Accuracy will also be enhanced with improvements of the optical systems, new cell dyes and markers, better techniques of illumination, recording and image processing. Contact endoscopy will stimulate even more collaboration between otorhinolaryngologists, pathologists, cytologists and cytopathologists.

Contact endoscopy of the upper aerodigestive tract is giving its first steps. Its potential in otolaryngology and head and neck pathology is enormous with many clinical implications. More developments will be possible with the experience of different departments and institutions.

Quantitative radiology.

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Many reports in the literature to date have recognized a positive correlation between tumour volume and prognosis for all subsites of the head and neck. After an introduction in the principles of tumour volume determination, the value of computed tomography (CT)-determined parameters as prognostic factors for treatment outcome of head and neck cancers after radiation therapy (RT) will be presented. The presentation will focus on T3 glottic carcinomas, emphasizing tumour volume and cartilage sclerosis. Different combinations of these two parameters resulted in CT-based pre-treatment risk profiles that were able to classify individual patients at low-, moderate and high-risk for local failure after definitive RT. This can potentially ensure a more accurate informed consent process when the relative value of surgery and RT for likelihood of local control are being discussed with a particular patient. Volume data might also be used for triaging larger volume tumours to pre-RT chemotherapy and to quantify therapy response to help select tumours in this high-risk group which are not likely to be amenable to laryngeal preservation by combined chemotherapy and RT. Quantitative data from other subsites (supraglottic larynx, nasopharynx, oropharynx and hypopharynx) will be outlined.

New horizons for histology.

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09.00–11.00 **PLENARY SESSION 14** (St. John's College)

OME AT THE MILLENNIUM
Chairmen: Mr J. G. Toner (UK)
Mr A. R. Maw (UK)

Regulation of immunity and proliferation in the middle ear: molecular and cell biological investigations.

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Following inflammatory stimulation, the middle ear (ME) is rapidly populated by leukocytes, and the ME mucosa undergoes intense proliferation and differentiation. This includes the development of respiratory mucosal features, including mucosal immunity. We are investigating host mechanisms that control these responses, using measures of gene expression and the delivery of bioactive molecules into the tympanic cavity in animal models.

ME immunity is initially derived from leukocytes that are recruited into the tympanic cavity from the peripheral circulation. This appears to occur via nonspecific mechanisms rather than, for example, preferential homing of mucosal lymphocytes. However, cytokines produced within the chronically stimulated ME enhance the production of IgA, and thus of mucosal immunity. Pro- and anti-inflammatory cytokines contribute to the regulation of inflammation and immunity.

Mucosal proliferative responses are mediated in part by growth factors. Members of the FGF family are expressed in the ME mucosa, and lead to proliferation of both the stroma and vasculature underlying the epithelium. VEGF and its receptors also contribute to neovascularization. Other factors involved in cellular communication, such as

nitric oxide, participate in proliferation and differentiation as well.

Host responses in the ME mucosa present new potential avenues for pharmacological intervention in otitis media.

Randomized controlled trial of early surgery versus watchful waiting for glue ear: the effect of language development in pre-school children.

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Objectives: To compare in children with persistent otitis media with effusion the effect upon speech and language development of immediate surgery (ventilation tube insertion) with a nine-month period of watchful waiting.

Design: Randomized controlled trial with blinded outcome assessment, carried out in Bristol Children's Hospital. The study included children born between 1/4/91 and 3/12/92 with confirmed bilateral otitis media with effusion and bilateral hearing impairment of 25/70 dB, persisting for at least three months. Surgery (ventilation tube insertion) within six weeks of establishment of eligibility was compared with a nine-month period of watchful waiting; with bilateral tube insertion if clinically indicated at the end of that period.

Main outcome measures: Hearing loss was measured by audiometry at 4000 Hz. Reynell Development Language Scales for expressive language and verbal comprehension and the Griffiths Mental Developmental Scale were used. All outcomes were measured at nine and 18 months.

Results: At nine months post-randomization there were marginally statistically significant differences between the two arms in terms of standardized scores for both expressive language and verbal comprehension, but only after adjustment for baseline differences. At nine months, for both verbal comprehension and expressive language, the Watchful Waiting Group were about four months further behind their expected levels than were the Early Surgery Group. Eighteen months following randomization, by which time 85 per cent of watchful waiting children had received surgery, there remained no significant differences between the two arms. The Early Surgery Group were at expected levels for equivalent age scores for expressive language and the deficit in the Watchful Waiting Group had considerably reduced.

Conclusion: These findings indicate that with respect to both expressive language and verbal comprehension, some benefit accrues from ventilation tube insertion but that the timing of surgery is not critical.

Middle ear gases.

M. Luntz
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How does middle-ear fluid cause conductive hearing loss?

S. N. Merchant, M. E. Ravicz, J. J. Rosowski
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Fluid in the middle ear is a primary feature of otitis media with effusion (OME), that affects at least 85 per cent of the general population at some point in their lives. Middle-ear fluid is associated with a conductive hearing loss of up to 30–35 dB, although the degree and frequency dependence of individual losses can vary. The mechanisms by which middle-ear fluid causes conductive hearing loss are not well understood.

We developed a cadaveric human temporal bone preparation in which we measured umbo velocity, middle-ear input impedance and middle-ear sound pressure for frequencies 100 Hz to 8 kHz using sound stimulus levels of 80–110 dB SPL in the external ear canal. These parameters were measured with the middle ear filled initially with air and then with increasing amounts of fluid. Location, volume and viscosity of the fluid were changed in a controlled manner. Changes in umbo velocity and middle-ear input impedance from the baseline condition (i.e. middle-ear filled with air) were used to indicate the effect of fluid on middle-ear sound transmission.

At high frequencies >1 kHz, hearing loss was caused primarily by mass loading of the tympanic membrane by fluid, and it resulted in decrease in sound transmission of up to 20–30 dB. The effect increased as more of the tympanic membrane was covered with fluid. At low frequencies <1 kHz, hearing loss was mainly due to an increase in impedance of the middle-ear air space resulting from reduced middle-ear air volume. An additional mechanism was damping of the tympanic membrane due to increased viscosity of the fluid, which was found to decrease sound transmission by an additional 5–10 dB across all frequencies. Negative middle-ear static pressure, which is often associated with OME may also result in hearing loss; however, this latter mechanism was not investigated in our temporal bone preparation.

Our results also have implications with respect to diagnosis and treatment of OME, which will be discussed.

09.00–11.00 **PLENARY SESSION 15** (Queen's College)

FACIAL PLASTIC FORUM
Chairmen: Mr T. R. Bull (UK)
Mr I. S. Mackay (UK)

The cleft-lip nose.

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In the surgical repair of the cleft-lip nose there are several important factors to consider:

The lip closure technique to ensure symmetry of the tip and alae to prevent a more conspicuous deformity during growth.

Timing of the operation before the puberty growth spurt to prevent psychological problems and to stop further expression of the deformity induced by septal growth.

Systematic surgical approach, dividing the operative procedure into septal surgery, tip surgery, osseocartilaginous vault surgery, maxillary augmentation and alar base reallocation.

Special post-operative care with the use of a vestibulum device to prevent deformation by scar tissue retraction.

Conclusion: With these considerations in mind the aim of the treatment should be a normal function of the nose with

an acceptable aesthetic result in which the young adult cleft-lip patient has lost the specific cleft-lip stigma.

The present role of the external approach for rhinoplasty.

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Assessment of the deformity is an essential pre-requisite in planning a rhinoplasty, and having defined the abnormalities, the surgical approach which allows the most reliable correction is usually chosen. The range of options open now to the rhinoplasty surgeon can be confusing, particularly with grafting, suturing and remodelling techniques. The modern external approach, which has its roots in Eastern Europe, provides unparalleled exposure of the lower nasal two-thirds, including the upper septum and the key area of the anterior septal angle. It permits accurate alignment of the skeletal framework, often supported by structural grafts before replacement of the soft tissue envelope. Major deviations, particularly involving the dorsal septum in the middle-third of the nose are more easily corrected via the external approach, especially in patients with small nostrils and a short infra-tip lobule. Asymmetries, and particularly secondary deformities of the tip, reconstruction of the septum and extensive grafting procedures are indications for the external approach. The presentation will review the techniques, illustrated by both congenital and acquired diseases excepting the cleft lip nose deformity.

Paediatric facial plastic surgery.

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There are two additional considerations in facial plastic surgery in children compared with adults. Firstly hypertrophic scars are more common, so care is needed in planning and minimizing incisions. Secondly the potential effects of operations on growth, and of growth on initially good surgical results, have to be considered, and parents advised that further procedures may be necessary later on.

Osteotomy techniques in rhinoplasty.

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There are two basic techniques for performing osteotomies in rhinoplasty surgery, external and internal. Internal osteotomies can be carried out using a Masing chisel producing a continuous osteotomy or a 2 mm osteotome or chisel resulting in multiple small punctures through the bone. These internal osteotomy methods have significant disadvantages.

External osteotomies done through small skin punctures and using a 2 mm or 3 mm osteotome or chisel are extremely versatile. The procedure itself is easy to perform and very accurate. It is useful as a standard rhinoplasty technique and can be used for special circumstances. The late refracture technique is one situation where external osteotomes are used to mobilize otherwise fixed nasal bones in a patient presenting late with a fractured nose where a formal rhinoplasty would usually be needed. Another use of the external technique is to narrow very wide nasal bones using an intermediate longitudinal osteotomy. A transverse intermediate external osteotomy can be used to straighten grossly bent nasal bones.

The only disadvantage of the external technique is the need for a puncture incision through the skin. A study of almost 100 patients post-operative photographs taken three and six months after surgery shows these incisions to be invisible.

Conclusion: The external osteotomy is easy, flexible and useful for the late refracture, the wide nose and the very deviated nose. The external skin punctures are invisible.

Total and partial nasal reconstruction.

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Cosmetic and functional improvement in nasal reconstruction depend on the provision of a good scaffolding, skin quality, symmetry and replacing whole aesthetic compartments. Autogenous cartilage from the conchal bowls provides the right contour for the lower lateral cartilages, and can provide good support elsewhere if necessary. In the non-smoker, without diabetes, who has no local scar tissue and has not had radiotherapy, it is possible to use a composite graft from the ear to provide support and an inner lining as this can obtain a good blood supply from an overlaid forehead flap. Alternatively, a large antero-inferior based septal mucosal flap can be swung laterally to produce an internal lining. Both an inner and outer layer of epithelium are required to prevent the graft contracting.

The loss of the whole septal cartilage, along with the skin and lateral cartilages whether by disease or radiotherapy poses a formidable problem. Titanium implants with a prosthesis provide a reliable and pleasing result which will last.

It is often a mistake to just replace the 'bite' or irregular segment of soft tissue which has been lost. To remove sound tissue in this unforgiving area takes courage but is necessary to produce an even contour and skin quality within that aesthetic compartment.

The psychological impact of the initial deformity, as well as that during the first stage of forehead flap, must not be overlooked even when the surgeon is satisfied with the technical aspects of surgery. Counselling and self-help groups are often helpful.

The role of laser skin resurfacing in facial plastics.

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The removal of fine and moderately deep facial lines or rhytides has been practised by facial plastic surgeons for many years. Historically the most effective way to treat these lesions has been with acid-based peels such as acetic acid or phenol, or dermabrasion. These procedures however were risky given that a controlled effect was not possible in all cases and there was a high risk of post-inflammatory hypo-pigmentation and occasional scarring. The advent of finely pulsed carbon dioxide lasers, which were originally developed with laryngeal microsurgery in mind allowed a computer-driven controlled thermal burn of the skin to be achieved. Based upon known skin and laser heat transmission parameters it was possible to

achieve a controlled depth of burn in all cases, giving the net effects of a first degree thermal burn. It had previously been noted that patients having first degree burns to the face were found to have a great improvement in rhytides in the burnt area once it had healed. Following surgical treatment which can be performed under local anaesthetic or sedation the skin needs extensive post-operative nursing and medical care regime. The most obvious consequence of surgery being prolonged erythema (three out of 12) in the treated area. The results in over 200 cases treated will be discussed and complications and their management will also be covered.

Conclusion: Laser skin resurfacing for facial lines is a safe and effective treatment in those not requiring formal face lift.

Management of the large nose.

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Nasal tip enlargement may be due to a number of factors, and the enlargement may be real or apparent. A number of factors cause real enlargement, for example thick sebaceous skin or bulky underlying supporting structures. Support structure enlargement may cause overprojection or broadening of the tip because of elongated or bulky alar cartilages. An elongated nasal spine, or overprojected quadrilateral cartilage may also produce a more prominent nasal tip. Factors such as an underprojected chin or a saddle deformity of the nasal dorsum may be the cause of apparent enlargement of the nasal tip.

Surgical management of the large nasal tip depends therefore firstly on assessment of the underlying anatomical problem and then of course dealing with the anatomical deformity. Thick sebaceous skin is not normally amenable to surgery but in severe cases of acne roseacea the skin bulk could be reduced by shaving, laser or dermabrasion. There are a number of techniques to reduce the size of either broad or overprojected alar cartilages. These include cartilage splitting techniques for the moderately projected tip, the Goldman tip technique for the broad or overprojected tip, and segmental resection of the medial and lateral crura of the alar cartilages. Generally one only uses segmental resection when the nasal tip is narrow but grossly overprojected.

Management of the apparent causes of nasal enlargement includes augmentation of either the under-projected chin or augmentation of a saddle deformity as appropriate. These techniques are useful in situations where the nasal tip may be of normal size but is out of proportion to the lower face or nasal dorsum.

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