Aspects of Plastic Surgery

Head and Neck Cancer

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I have grouped intraoral, orbital, middle ear, and parotid lesions under head and neck cancer. The plastic surgeon may excise and reconstruct the lesion by himself or with an ear, nose, and throat surgeon or a general surgeon. In special areas requiring a combined intracranial and extracranial resection co-operation with a neurosurgeon is mandatory. The contribution of the radiotherapist to treatment in the presentday context is so important that this will be discussed separately.

Intraoral Carcinoma

The lesion in intraoral carcinoma is squamous carcinoma in most cases, it is usually a disease of the elderly, denture-wearing patient, being commoner in heavy smokers and alcoholics. Exotic causes such as betel nut chewing and reversed cigar smoking exist in some parts of the world but not yet in Britain. Leukoplakia is a precursor in some cases.

Though for descriptive purposes the mouth is divided into areas, frequently the lesion has spread to an adjacent area and the exact point of origin may be difficult to determine. In roughly decreasing frequency of involvement the areas are—lower alveolus, floor of mouth, tongue, retromolar triangle, upper alveolus, and the buccal aspects of the cheek. Metastases, which may develop relatively early, are to the cervical lymph nodes—while direct invasion of the mandible, especially in alveolar lesions, is frequent. The main problem with this condition is early diagnosis: the patient may ignore the lesion because he is not aware of it or because it is painless and seems unimportant. He may treat himself by leaving out his dentures and taking mouthwashes. When he does go to his doctor or dentist there may be further delay with denture easing, mouthwashes, and observation only. Any intraoral ulcer (apart from the most shallow) especially in association with areas of leukoplakia must be referred to whatever department deals with head and neck cancer. Otherwise there may be delay while useless exercises such as observation, swabs of the ulcer, and various blood investigations are carried out.

On admission to hospital it should be noted whether the patient is a heavy smoker or drinker when assessing his general health. A general intraoral examination is undertaken to eliminate other lesions and to note the presence or absence of leukoplakia, and the neck is palpated using both hands as the doctor stands behind the patient. This is done slowly and systematically making sure that no area is excluded. It is easy to make errors at this stage, the submandibular gland and the carotid bulb occasionally being mistaken for enlarged lymph nodes. X-ray examinations of mandible and maxilla in alveolar or extensive

floor of mouth lesions—especially where pain is present—may indicate local involvement. A chest x-ray examination eliminates or confirms pulmonary metastases. If the latter are present no further treatment is contemplated.

RADIOTHERAPY

Whether radiotherapy is the treatment of first choice often depends on local attitudes and which department has become established as the therapeutic agency. For the smaller lesions radiotherapy may give good results, but some problems arise when this fails. In the past, and less frequently since the introduction of supervoltage units, the vascularity of the area was reduced and surgical complications arising from the resulting ischaemia were frequent and serious.

We prefer surgery as the initial line of treatment and then to discuss the necessity for radiotherapy as judged by the adequacy of clearance on histological examination. In some clinics a subtumour dose of radiotherapy is given before surgery but it is difficult to assess the efficacy of this treatment regime yet. Ideally the patient should be seen at a combined plastic surgery/radiotherapy clinic and a joint decision made about treatment after adequate examination and discussion.

SURGERY

Small early lesions, few of which are seen, may be excised and closed directly or if this is not possible, skin-grafted. In most cases such conservative surgery is not possible and a more major intervention is necessary.

If there is any doubt as to the diagnosis a preliminary biopsy may be taken under local anaesthetic or, where the facilities exist, a frozen section examined and surgery undertaken with the minimum of delay. Where large resections are contemplated a tracheostomy is established. This is a prophylactic against the development of airway problems postoperatively; occasionally only a nasotracheal airway is used after surgery. Tongue, floor of mouth, lower alveolar, and postmolar triangle lesions are excised with an in-continuity dissection of cervical lymph nodes. The procedure begins with the neck dissection through a Y-shaped skin incision or a strap incision if there are worries over skin vascularity as a result of radiotherapy. Lymph nodes, sternomastoid muscle, and the internal jugular vein are removed. As the dissection proceeds up the neck the external carotid artery is divided, the lower pole of the parotid gland, the submandibular gland, and in some cases the anterior and post bellies of the digastric muscle are taken. In most cases, apart from lesions well confined to the tongue and not associated with the mandible, a mandibular resection is performed, a hemimandibulectomy often being the most convenient. The intraoral defect is now considerable; in the past this was reconstructed simply by drawing the edges together. This resulted in extensive fibrosis causing gross deviation of the remaining mandibular segment with its attendant dental occlusal problems and difficulties in mastication. To prevent this a flap is introduced to reconstruct the area. The two most commonly used are the forehead flap and the deltopectoral flap. The former is introduced through an incision

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FIG. 1—Resection for carcinoma of lower alveolus (a); temporal flap raised (b); final reconstruction (c).

in the cheek and the latter coming from the chest through a neck incision. This gives a fairly watertight closure.

When a full thickness excision of mucosa and skin is necessary the temporal flap may be used for inner cover and the deltopectoral

This is a prophylactic against the development of airway problems postoperatively; occasionally only a nasotracheal airway is used after surgery. Tongue, floor of mouth, lower alveolar, and postmolar triangle lesions are excised with an in-continuity dissection of cervical lymph nodes. The procedure begins with the neck dissection through a Y-shaped skin incision or a strap incision if there are worries over skin vascularity as a result of radiotherapy. Lymph nodes, sternomastoid muscle, and the internal jugular vein are removed. As the dissection proceeds up the neck the external carotid artery is divided, the lower pole of the parotid gland, the submandibular gland, and in some cases the anterior and post bellies of the digastric muscle are taken. In most cases, flap for the external surface. The flaps are left in position for three weeks until their vascularity is secure and then the bridge of skin containing the supplying vessels is divided and the surplus flap returned to the forehead or chest (fig. 1).

After the operation the patient is nursed in an intensive care area since the tracheostomy or nasotracheal airway is maintained for 48-72 hours. A nasogastric tube is used for feeding until swallowing is established. A high-protein fluid diet is given together with vitamin and iron supplements. It is in this phase that delirium tremens can emerge in the alcoholic and in these cases a high potency multivitamin preparation is given with sedatives as necessary. Since many patients with intraoral carcinoma are alcoholics the development of delirium tremens must be looked for since false information is frequently given beforehand. The neck is drained for several days using suction; this allows the neck flaps to adhere to the underlying structures. The patient is mobilized early and encouraged to begin swallowing as soon as this is physically possible since delay can induce tube dependence and delay in rehabilitation. It is our custom not to graft the flap donor sites at the time of surgery but to leave these for 24-48 hours and then apply skin grafts which have been stored at 4° C since surgery. The grafts are left exposed without dressings. This saves operating time, increases success of graft take, and allows all dressings to be dispensed with in the early postoperative phase. It also boosts the patient's morale at an early stage.

Soon after the second operation the patient is allowed home, returning to have the sutures removed. The total period of hospital admission is about four to five weeks. It takes some

time before normal swallowing is regained and before the stiffness caused by the neck dissection clears up. In many cases speech does not revert completely to normal, slurring and articulation defects persisting. In addition many patients will complain of a stiff shoulder due to accessory nerve section. Initially the patient exists on a soft diet since chewing is difficult, later progressing to cut-up meat. After several months without recurrence, and with satisfactory resolution, the help of a prosthodontist may be sought since denture fitting may be possible in many cases. It is unfair to refer this type of problem to a general dental practitioner. Even when a denture has been made and fitted it may not be functional and may rarely be worn. Is the deficient mandible ever reconstructed for cosmetic or functional reasons? Certainly this is not recommended at the time of resection because it is never certain which tumour will or will not recur. Surprisingly few patients wish to have later reconstructive surgery: this would be of little functional help and the cosmetic defect is frequently rather inconspicuous. Should reconstruction be performed in the long term this may be accomplished using an iliac crest or rib bone graft. Follow-up is initially frequent and then extends gradually to three-monthly, four-monthly, and eventually six-monthly intervals. We find that absence of recurrence for one year often means complete eradication of disease.

Maxillary Tumours

Maxillary tumours are considered separately because the method of treatment is slightly different. They may be carcinoma arising in the upper alveolus, of the palate invading the antrum, or they may originate in the antrum and ulcerate through the palate. Occasionally the tumour may be an osteogenic sarcoma or reticulosarcoma. Occasionally the orbital floor is invaded and signs of intraorbital pressure are noted—example, unilateral proptosis. Though in reticulosarcoma good results are obtained with radiotherapy, in the others surgical extirpation is recommended. The preoperative recommendations stated earlier are also observed. In some cases frozen section control may be advisable during surgery to assess adequacy of resection.

The maxilla is approached by turning a flap consisting of upper lip, cheek, and lower eyelid like a leaf of a book based laterally. As required, part or all of the maxilla may be removed,

and orbital involvement may necessitate total exenteration. After this a large, raw, intraoral cavity is present and this is simply covered with a split skin graft, pressure being obtained by a pack mounted on a specially constructed denture. Since the graft must be held in constant position against the raw area the denture is fixed in position by bars attached to cranial pins as for the treatment of some facial fractures. This situation is maintained for 10-14 days and the denture and pack withdrawn. The skin graft usually takes well. An impression is taken and a build-up denture inserted immediately to maintain counter-pressure to contracture due to healing. The patient wears this type of denture from now on; the intraoral defect is covered with a thin skin graft which allows for easy scrutiny of the resection area. The denture deals with any cosmetic and functional defect which might result and reconstruction is

FIG. 2—Patient wearing external prosthesis following total maxillectomy and orbital exenteration.

virtually never undertaken. If an exenteration has been necessary then an external prosthesis mounted on spectacle frames is worn (fig. 2). If there is no involvement of neck nodes then neck dissection is not done.

The most important aspects of the results is, of course, survival. Unfortunately this is difficult to state accurately since results vary from centre to centre and with the size and position of the tumour. The overall survival rate is 50%-60%, early or small tumours having a much greater success rate. A moderately sized squamous carcinoma on the tongue will have a poorer prognosis than a similar lesion on the alveolus. A lesion with metastases in the neck nodes will be a worse proposition than one without. A recurrent lesion with involved neck nodes after radiotherapy may have a stormy postoperative course and the patient may succumb as a result but, if not, will have a poorer prognosis than a fresh case. If a patient survives for a year after surgery then the chance of him having a recurrence is slight.

Orbital Tumours

Into this much smaller group of orbital tumours fall carcinomas of the lacrimal gland, conjunctival or lid malignant melanomata, sarcomata, malignant eye tumours, basal and squamous cell

carcinomata invading deeply into the orbit, or tumours encroaching on the orbit from the meninges or frontal sinus. These may present as ulcerated lesions around the eyelids, unilateral proptosis, or frontal and orbital pain. In the early cases where only the globe or periorbit are involved then an exenteration of the orbital contents with subsequent split skin grafting will give good results and a high cure rate. Where bone is involved, especially high in the orbit, then a combined intracranial and extracranial approach by the neurosurgeon and plastic surgeon is recommended.¹ If a more conservative approach is used the results are poor because the completeness of excision is always in doubt.

The intracranial involvement is explored via a frontal craniotomy because the feasibility of excision depends on the intracranial extension—for example, dural involvement may be dealt with by excision but the chances of recurrence are greatly increased. If resection is feasible a block specimen of orbit, as extensive as is felt necessary, together with overlying skin is removed. Any dural loss or tear is dealt with by fascia lata patch grafting or direct suture. The external defect is covered with a temporal flap and an external prosthesis mounted on a spectacle frame completes the reconstruction. Should there be doubt as to the adequacy of excision then early radiotherapy can be given since a good flap reconstruction has been performed.

It is difficult to assess the results because this type of surgery has become feasible only over the past few years. Undoubtedly the prognosis of tumours such as the sinister lacrimal gland carcinoma is greatly improved by this radical form of treatment.

Middle Ear Carcinoma

This is a rare but particularly distressing condition often occurring with a chronically discharging ear, and the patient may present in an advanced stage. Occasionally it may be secondary to a squamous carcinoma arising in the external auditory canal and invading the middle ear cavity. The ear may have been discharging for some time, being accepted almost as normal, but when pain occurs and increases in intensity the patient seeks help; at this stage bone invasion has almost certainly begun. The presence of blood in an ear discharge warrants immediate referral. The most serious prognostic sign which is frequently seen is facial palsy. Examination of the ear may show a fleshy mass presenting at the external auditory meatus or in the depths of the canal. An immediate biopsy at this point is recommended. Tomography is usually performed and may be helpful in showing up areas of bone involvement.

In the past this condition was treated by extended radical mastoidectomy and radiotherapy. A study of cases treated by this method over the past 15 years showed that no patient survived over one year—because spread into the middle cranial fossa occurs early with resulting dural involvement.

A few centres have practised more radical treatment over the past few years involving an intracranial and extracranial approach with complete removal of the petrous temporal bone.

Unfortunately the cases are often referred after the more commonly performed mastoidectomy and radiotherapy have failed and the tumour may be outside surgical control. The operation is extremely difficult technically; it consists of removal of the ear and surrounding skin, a radical neck dissection, and a total en bloc removal of the petrous temporal bone. If dura is involved it is excised and replaced with fascia. The skin defect is closed with a scalp flap or deltopectoral flap. Since the 7th, 8th, 9th, and 10th cranial nerves are sacrificed, in part or completely the patient is deaf; has a facial palsy on the affected side; and may well have swallowing difficulties which may persist for some time.

In the past operative mortality has been high but this need not be so. Wilson *et al.*² and our own larger series show better results with this procedure than with the more conventional treatment of middle ear carcinoma. In previously untreated cases radiotherapy may be given after petrosectomy but can cause severe nausea. The true value of this procedure cannot be assessed until many fresh cases have been treated. In external ear carcinomas invading the petrous temporal bone the operation is curative in most cases.

Parotid Tumours

The patient with the parotid swelling presents a classical diagnostic problem. If it is smooth, mobile, and long-standing no matter its size then a mixed salivary tumour (pleomorphic adenoma) is the most likely diagnosis, though in some cases the diagnosis will be adenolymphoma. Fixation to the skin or deeper structures, ulceration, pain, facial palsy, or ear discharge suggest malignant change in a pleomorphic adenoma or a frankly malignant tumour such as an adenocystic or mucoepidermoid carcinoma. One may go along the traditional diagnostic road of, for example, soft tissue x-rays examination or sialograms, but at the end of the day most patients will come to surgery. If the diagnosis is in doubt a frozen section at the time of surgery may help. In pleomorphic adenoma or adenolymphoma the superficial lobe is usually involved and a superficial parotidectomy with sparing of the facial nerve is curative. In malignant tumours a total parotidectomy with or without a neck dissection is indicated and a resulting facial palsy must be accepted. If overlying skin is involved this is widely excised and if there is bony invasion then a partial petrosectomy by a combined intracranial and extracranial approach is desirable. Radiotherapy is of little value in the treatment of these lesions.

In most pleomorphic adenomata with malignant change the

results of radical surgery are very good. Adenocystic and mucoepidermoid carcinomata have a definite tendency to local recurrence even years after resection. They also tend to metastasize to cervical lymph nodes and lung. Fortunately, patients may live symptomless for many years with pulmonary involvement, especially with adenocystic carcinoma.

Conclusion

Radical surgery has undoubtedly improved the prognosis in head and neck cancer, but what is the quality of life attained by the survivors? Life is sweet and, after a difficult period of adjustment, when medical advisers and relatives must do all they can to help, most patients settle down, many return to work, and almost all are grateful for being cured; psychological problems are minimal.

References

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Occasional Survey

Molecular Basis for some Disorders of Haemoglobin Synthesis*—II

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Thalassaemias

The thalassaemia syndromes are a heterogeneous group of disorders characterized by a reduced rate of synthesis of one or more of the globin chains of haemoglobin. These conditions are the commonest haemoglobinopathies. They occur sporadically in every racial group and present a massive public health problem in many parts of the world. In areas where these conditions are highly prevalent, with carrier rates of between 5% and 20%, the large numbers of homozygotes cause a major drain on blood transfusion resources.

HETEROGENEITY OF THALASSAEMIAS

Many different disorders of haemoglobin synthesis can produce the clinical picture of thalassaemia. These may be classified into two main groups, however, depending on which globin chain is produced ineffectively—that is, the α -thalassaemias and the β -thalassaemias.¹ Within each group there are many different varieties. Furthermore, the thalassaemia genes may be inherited

together with those for structural haemoglobin variants so as to produce a complex series of clinical disorders all characterized by a reduced rate of globin-chain synthesis. In Thailand, for example, over 50 such conditions have been identified.¹

CELLULAR PATHOLOGY OF THE THALASSAEMIAS

All the thalassaemia syndromes have in common a reduced rate of synthesis on one-half of the haemoglobin molecule and thus imbalanced globin-chain production.²⁻⁴ In the β -thalassaemias this leads to the production of an excess of α -chains in many of the red-cell precursors. Since fetal haemoglobin (γ -chain) synthesis persists in some cell lines part of the excess α -chain is combined with γ -chains to produce haemoglobin F. This occurs in only a limited number of red-cell precursors and others are left with a large number of α -chains with no partner chains. The uncombined α -chains are unstable and precipitate, producing large inclusion bodies.⁵ The presence of these inclusions causes considerable abnormalities of cellular maturation and proliferation and many of the affected red-cell precursors never leave the bone marrow. This is the mechanism for the striking degree of ineffective erythropoiesis common to all the thalassaemia disorders. Such cells as do leave the marrow have a shortened survival because they suffer damage due to the presence of rigid inclusions, and many of them are sequestered in the spleen and other parts of the reticuloendothelial system. Thus the anaemia of severe β -thalassaemia results from a combination of ineffective production and reduced survival of the red cells.

Most of the clinical findings of β -thalassaemia can be related to the primary imbalance of globin-chain synthesis.^{4, 6, 7} Affected

*Conclusion of the 1974 Watson Smith lecture given at the Royal College of Physicians of London on 8 May 1974.

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