TREATMENT OF MALIGNANT NEOPLASMS OF THE EYELIDS* SURGERY OR IRRADIATION ?

BY

H. B. STALLARD

London

THE fact that most general surgeons and indeed a number of eye surgeons continue to refer patients afflicted with malignant disease of the eyelids to the ever-willing and co-operative radiotherapist and the fact that some of the serious disasters of radiotherapy of the eyelids are not widely known prompt me to compare the results of surgery with radiotherapy.

What is the case for radiotherapy? For over quarter of a century most authors of the standard surgical text-books have written in favour of irradiation. It is regrettable that, even in the larger works intended for post-graduates taking higher degrees in surgery and radiotherapy, there is a notable absence of comment about the serious ocular complications which may sometimes follow irradiation. I am aware that as ophthalmologists we see more of the disasters and less of the successes of irradiation; nevertheless, the former are grave and lasting and as they do not follow adequate surgical excision with reconstruction it seems proper to draw attention to the advantages of surgery over radiotherapy.

THE LITERATURE

So eminent an authority as Cade (1952) stated:

"With very few exceptions the majority of authors in England, on the Continent, and in the U.S.A. agree that radiation has proved of such value that it has displaced most other methods in the treatment of rodent ulcers".

Ward (1930) also considered that radium was the method of choice.

Hutchison and Hilton (1948) recommended that "malignant neoplasms of the eyelids should be treated by radium, or x rays, because of the deformity caused by excision".

Aird (1957) comments that "the rodent ulcer can be depended upon to disappear by x-ray treatment".

Illingworth (1955) advises "treatment in most cases by radium, a surface plaque. If radium is not available excise".

Bailey and Love (1956) recommend early excision in one chapter of this work, but on p. 708 state:

"If the ulcer occurs on the face this line of treatment (excision) is not advised as an unsightly scar may result. The application of a radium plaque is recommended".

As 98.4 per cent. of basal-celled carcinomata occur on the face and neck and

* Received for publication June 11, 1958.

68.3 per cent of these appear within the "mask" area bounded by the supra-orbital margins above, the auricles on either side and the angles of the mouth below, it would seem that these authors reserve surgery for less than 2 per cent. of basal-celled carcinomata and do not consider it proper for the eyelids.

However, Handfield-Jones, and Porritt (1957) advise that "excision of the neoplasm is the best treatment".

It has been argued in favour of radiotherapy that the patient does not need a hospital bed and may be treated as an out-patient. No comment is made about the uneconomic loss of time, the protracted suffering, and the ultimate disability caused by some intractable post-irradiational complications which may require attendance at the Eye Outpatient Department for months and even years, often with admission to hospital for long periods of time.

BIOPSY

As the cellular structure of a malignant tumour of the eyelids often varies in different parts and as some types are less favourable for irradiation than others, it is obviously desirable to take for adequate histological examination a strip of neoplasm which traverses its full length and depth. Such is seldom achieved and moreover the disturbance effected by a biopsy is often dangerous. Without a biopsy the radiotherapist must inevitably feel inadequately informed.

So it would seem reasonable to excise the neoplasm widely (an excisional biopsy) and to reconstruct the lid defect by grafting.

POST-IRRADIATIONAL COMPLICATIONS

Skin.—Some changes in the texture of the skin and subcutaneous tissues at the site of irradiation are inevitable after irradiation. The lesser degrees of skin atrophy, loss of elasticity and epilation, are of little consequence in an area less than 1 cm. in diameter. Severer degrees of irradiational damage result in cicatricial ectropion (Fig. 1, opposite) with impairment of lid mobility and exposure of the eye. Some irradiated scars become chronically painful and for this reason require excision and grafting on to a base rendered disadvantageous by vascular damage and fibrosis.

An indolent ulcer (Fig. 2) may occur in an irradiated area, particularly at the medial canthus; the surrounding tissue being too damaged to support a free full-thickness skin graft, the cosmetically less desirable pedicle has to be used (Fig. 2, opposite).

Necrosis of part or the whole of the full thickness of the lid may follow irradiation. Fig. 3 (opposite) shows a post-irradiational coloboma of over half the left upper lid; Fig. 4 (opposite) shows much loss of the upper lid after irradiation, and Fig. 5 (opposite) extensive necrosis of the left lower lid with recurrence of the neoplasm.

Fig. 6 (opposite) shows an example of carcinoma induced by irradiational treatment of the skin of the eyelids and face for sycosis.

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FIG. 1.—Irradiation of basal-celled carcinoma at right medial canthus. Painful scar. Cicatricial ectropion and occlusion of lacrimal canaliculi and lacrimal sac. Keratinization of bulbar conjunctiva, superficial punctate keratitis, and irradiational cataract.

FIG. 2.—Irradiation of basal-celled carcinoma at right medial canthus. Chronic post-irradiational ulcer. Skin graft to excised ulcer bed from frontal pedicle flap after severance of pedicle.

FIG. 3.—Post-irradiational coloboma of more than half of the left upper lid.

FIG. 4.—Post-irradiational loss of right upper lid.

FIG. 5.—Post-irradiational necrosis in left lower lid with recurrence of basal-celled carcinoma.

FIG. 6.—Appearance of basal-celled carcinoma in left lower lid after irradiation for sycosis. The eye is aphakic (post-irradiational cataract). The skin of the entire face was thin, atrophic, and inelastic, with bad telangiectases and multiple carcinomata.

The poor blood supply in an irradiated area may prejudice the successful take of a free skin graft, but this is not always so. Fig. 7 (A) shows a post-irradiational cicatricial ectropion and Fig. 7 (B) a free full-thickness skin graft of the entire lower lid which had a 100 per cent. take.

FIG. 7 (A).—Post-irradiational cicatricial ectropion of left lower lid. (B) After excision of irradiational scar and full-thickness graft of whole lid.

Lacrimal Apparatus.—Irradiation at the medial canthus leads inevitably to the firm occlusion of the puncta, canaliculi, and all or most of the lumen of the lacrimal sac and naso-lacrimal duct (Fig. 1). Furthermore, the tissues around these structures are so affected by irradiation that it is impossible to keep open any surgical anastomosis made between the conjunctival sac and the nasal mucosa, so that permanent epiphora is the patient's uncomfortable fate.

In the case of surgical excision of a neoplasm at this site with the sacrifice of the lower canaliculus, tear drainage may be established either by transplantation of the upper punctum and canaliculus or by conjunctivo-dacrycystostomy, where the mobilized fundus of the lacrimal sac is opened and sutured in the lacus lacrimalis (Fig. 8, A and B).

FIG. 8 (A).—Infiltrative type of basal-celled carcinoma of right medial canthus. (B) Neoplasm widely excised with the lower canaliculus, and defect filled by a pedicle from the upper lid lined with a conjunctival graft.

Eye

Superficial Punctate Keratitis.—This post-irradiational complication may continue for 2 or 3 years.

Cataract.—It is impossible to achieve adequate protection of the lens by a lead contact mould set in the conjunctival sac, for x rays fired either obliquely or transversely at a neoplasm involving a canthus will out-flank such a protective device.

Iridocyclitis and Complicated Glaucoma.—These may follow irradiation, and occasionally lead to the loss of the eye.

SURGICAL EXCISION

There is much in favour of adequate surgical excision with reconstruction of the defect. The eradication of the neoplasm is more certain than with irradiation, and, in my experience, contrary to the opinion expressed in some text-books, the incidence of recurrence after surgery is quite rare, whereas this is not so after irradiation.

Whiting (1951) made the point that surgical treatment initially gives more successful results than surgery of a recurrence after irradiation.

The structure and the function of a surgically reconstructed eyelid is more natural and mobile than after irradiation. After the first dressing there is no discomfort whereas this is not the case after irradiation. Surgery does not damage adjacent tissues and is not followed by ocular complications.

General surgical books, presumably mindful of scars made by grosser suturing, stress the deformity which may be seen after surgical attention; this accusation is unjustified by the results which follow careful reconstructive technique.

PRINCIPLES OF SURGICAL RECONSTRUCTION AFTER EXCISION

(1) Excision. Reconstruction with Free Skin Graft.—If the neoplasm has proliferated well above the skin surface, and has not infiltrated deeply, and if its margin is at least 4 mm. clear of the lid margin (Fig. 9A, overleaf), excision up to the lid margin, 5 mm. wide elsewhere and through the orbicularis muscle down to the tarsal plate, is generally adequate. The adjacent orbicularis muscle is mobilized and sutured to the anterior surface of the tarsal plate with a few interrupted sutures of 20-day 5/0 chromic catgut. An exact pattern of the skin defect is made with oiled silk and a full-thickness free skin graft is cut from the redundant skin of the upper lid in the elderly in the case of a graft of 2×1 cm., and from the retro-auricular skin when the patient is middle-aged and the defect is larger than 2×1 cm.

The sutures uniting the edge of the graft to the adjacent lid skin are left long and when suturing is complete these are carried over a moulded spindle of flavine wool and tied. A pressure dressing is applied.

Donor eyelid skin tones in perfectly and retro-auricular skin carefully chosen does likewise (Fig. 9B, overleaf).

FIG. 9 (A).—Basal-celled carcinoma of the right lower lid. (B) 2 years after excision and full-thickness graft.

(2) Closure of a Small Full-thickness Defect by Mobilization and Sliding. Wheeler's Halving of Lid Margin.—When the lid margin is involved in the neoplasm (Fig. 10A), or the latter has infiltrated deeply and less than one-third of the length of the eyelid is involved, either a triangular or a quadrilateral excision of the full-thickness of the lid is indicated. The defect is closed by sliding the lateral part of the lid towards the medial edge after performing a vertical myotomy of the orbicularis muscle below the lateral canthus (Fig. 10B) and a lateral canthotomy. The opposed edges of the lid coloboma are halved by splitting the “grey line” and excising a triangle from each, the base being at the lid margin, the anterior consisting of skin and orbicularis muscle, and the posterior of tarsal plate and palpebral conjunctiva. One or two mattress sutures (Fig. 10B) traverse these to effect opposition. This halving prevents a vertical notch at the site of union on the lid margin.

FIG. 10 (A).—Basal-celled carcinoma involving lower lid margin. (B) Full-thickness excision of one-third or less of the eyelid. Closure aided by orbicularis myotomy at lateral canthus and Wheeler's halving operation of lid margin.

(3) Reconstruction of Large Full-thickness Defect by a Mucosa-lined Bridge Pedicle.—When more than one-third of the lid margin and deeper tissues

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of the lid are involved in the neoplasm then almost total, or indeed total, excision is indicated. Such extensive reconstruction of the lower lid is less formidable than the upper.

Lower Lid Reconstruction.—After excision of most or all of the lower lid, the upper-lid margin is freshened as for tarsorrhaphy and is sutured to the skin and muscle edge of the defect. A “delayed” bridge pedicle of skin of the upper lid is now raised, lined, either with a free buccal mucous membrane graft or with conjunctiva excised from the upper fornix, and temporarily replaced, a strip of oiled silk separating the mucosal lining from the orbicularis muscle of the upper lid (Fig. 11A).

FIG. 11.—Total loss of left lower lid. (A) Upper lid margin sutured to cheek. “Delayed” bridge pedicle in upper lid lined by buccal mucosa. (B) One week later, tarsorrhaphy severed, “bridge” pedicle transposed to form new lower lid, and skin defect in upper lid filled by full-thickness skin graft.

A week later the temporary tarsorrhaphy is divided and the mucosa-lined bridge pedicle from the upper lid is swung down and sutured into the lower lid defect; to enhance its blood supply and to assist in maintaining its desired position its upper edge is sutured to the raw surface of the upper lid margin prepared for the tarsorrhaphy (Fig. 11B). Into the skin defect of the upper lid at the site of the bridge pedicle a full-thickness free skin graft is placed. When the mucosa-lined bridge pedicle has been in place for 2 months the tarsorrhaphy is severed and the ends of the pedicle trimmed and replaced in the upper lid (Fig. 12, overleaf).

Medial and Lateral Halves of Lower Eyelid.—The neoplasm is widely excised. In the case of the medial canthus, this involves the sacrifice of the lower lacrimal punctum and canaliculus. If epiphora is troublesome at a later date, either transplantation of the upper canaliculus or the opened

FIG. 12.—Result in case illustrated in Fig. 11, showing eyelids open and closed.

fundus of the lacrimal sac into the lacus lacrimalis is tried in an attempt to re-establish the drainage of tears. The upper lid margin is freshened and sutured to the inferior edge of the lower lid defect. A delayed skin pedicle lined by mucosa of appropriate size is cut in the upper lid.

One week later the tarsorrhaphy is severed and the mucosa-lined pedicle is swung down into position to fill the defect and to give some improved support at the canthus (Fig. 13A and B).

FIG. 13. (A).—Basal-celled carcinoma involving medial canthus. (B) After excision of neoplasm and reconstruction with mucosa-lined skin pedicle from upper lid. (The central notch in the lid margin requires a small plastic procedure for its elimination).

Upper Lid Reconstruction.—When the neoplasm has infiltrated deeply into more than one-third of the upper lid and the lid margin is affected,

adequately wide excision presents a more serious reconstructive problem than in the case of the lower lid (see Figs 3 and 4).

If possible, the upper rim of the tarsal plate with the insertion of the levator palpebrae superioris is conserved and at any rate this muscle must be identified and held in three or four "whip" sutures of 20-day 5/0 chromic catgut. The conjunctiva of the upper fornix is undermined and mobilized to turn down with the remains of tarsus. The grey line of the lower lid margin is split and the line of cleavage made down to the level of the lower fornix. The lower tarsal plate and palpebral conjunctiva, thus separated, are then mobilized by vertical cuts at the medial and lateral ends of the plate, which is now brought up and sutured with 20-day 5/0 chromic catgut either to the lower margin of any remains of the upper tarsal plate or to upper fornix conjunctiva and levator palpebrae superioris. The eye is thus covered by conjunctiva (Fig. 14).

FIG. 14.—Drawing to show surgical steps in reconstruction of upper lid. Splitting of lower lid in grey line, and mobilization of tarsal plate and palpebral conjunctiva, which is sutured to frill of conjunctiva in upper fornix and to levator palpebrae superioris. A bridge pedicle of skin and orbicularis muscle is raised from the skin below the eyebrow.

A bridge pedicle of orbicularis muscle 1.5–2 cm. wide is now dissected from the peri-orbital part of this muscle and is brought down to cover the tarsal plate, to which it is anchored by a few interrupted catgut sutures.

It may be possible to bring down a bridge pedicle of skin from just below the orbital margin and to suture this to the everted raw surface of the lower lid margin. Into the skin defect whence this bridge pedicle has been taken, a full-thickness free post-auricular skin graft is placed (Fig. 15A and B).

FIG. 15. (A).—Drawing to show bridge pedicle of skin and orbicularis brought down and sutured to lid margin. Skin defect at donor site of bridge pedicle is filled with a full-thickness post-auricular skin graft. (B) 8 days after operation.

2 to 3 months later the tarsorrhaphy is opened, and the lower margin of the tarsal plate of the lower lid is cut along its full length and is united by fine silk mattress sutures to the lower margin of the upper-lid skin.

The conjunctiva of the lower fornix should be in good position for suture to the lower-lid margin by mattress sutures of fine silk.

The skilled radiotherapist may justifiably plead that his successes, and there are many, are comparable to surgical successes, and that the failures which may occur in units where there is defective judgement, skill, and experience are comparable to the unsatisfactory results produced by a surgeon unskilled in reconstructive work. However, serious irradiational complications are worse than surgical failures and considerably more difficult to remedy.

So a plea is made for the surgical treatment of malignant neoplasms of the eyelids. The healing is quicker and cleaner; and the structural and functional results are better than after irradiation. In my opinion the incidence of recurrence of the malignant neoplasm is appreciably less after adequate surgery than after irradiation, and there are no serious ocular complications.

I thank Dr. Peter Hansell and the Medical Illustration Department of the Institute of Ophthalmology, and Mr. Norman Harrison of St. Bartholomew's Hospital, for the abundant help they have so kindly given me over the illustrations, and also Mr. Frank Neubert for the post-operative photograph (Fig. 9B).

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