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Local Resection Versus Enucleation in the Management of Choroidal Melanoma

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The management of choroidal melanoma remains controversial and for this mini symposium we thought it useful to summarise the results, to date, of our experience in managing choroidal melanomas by local surgical resection and to compare the results, if only in a preliminary fashion, with the outcome after enucleation.

The published figures for survival after enucleation for choroidal melanoma vary quite widely. Jensen[1,2] has published the most complete data. He found the probability of death from metastases to be 60 per cent over a 25 year period with the majority of deaths occurring in the first year after enucleation. Prognosis was better in the case of women under the age of 40, for small tumours as compared with large, for spindle celled tumours, for those not showing scleral invasion and for lightly pigmented tumours. The differing composition of various series in relation to these differing features probably accounts for the reported variation in survival rate. A number of other recent studies[3,4] has confirmed the importance of these different prognostic features. In a study in which multivariate analysis was used the size of the tumour was shown to be the most important factor influencing prognosis.[5]

We have histology and survival data on 241 patients undergoing enucleation for choroidal melanoma and 157 patients managed by local surgical resection out of a total of some 200 such operations. (Those with a short follow-up have been excluded).

The technique used has been described before[6,7] but consists of a lamellar scleral dissection to approach the tumour which is resected from the eye with a surround of healthy choroid and the inner scleral lamella which is in contact with the tumour. Where possible the retina is left *in situ* and intact. To achieve haemostasis the operation is carried out under hypotensive anaesthesia.

The results of surgery in relation to the quality of vision retained and the incidence of complications such as intraocular haemorrhage, retinal detachment or tumour recurrence depend very much on the size and location of the tumour pre-operatively. Large tumours obviously pose greater technical difficulties than smaller tumours. Involvement of the ciliary body is more likely to be complicated by post-operative vitreous haemorrhage and retinal detachment than is the case for tumours situated entirely within the choroid. Tumours abutting the optic nerve head obviously pose their own problems.

Results

We shall give our overall results and also subdivide the material in the hope that we can identify those tumours where local resection might be considered an appropriate method of treatment and those where we would not now elect to use this form of therapy.

Retention of Globe

The number of patients retaining a cosmetically satisfactory eye after surgery was 123 out of 157 operations (78 per cent). Looking further at the outcome in relation to whether or not the ciliary body was involved,

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for those cases without ciliary body involvement 73 out of 87 patients (84 per cent) retained the eye while for those with ciliary body involvement the figures were 50 out of 70 operations (71 per cent).

Another factor influencing retention of the globe was the pre-operative size of the tumour. For tumours of up to 15 mm in diameter 91 out of 113 patients (81 per cent) retained a cosmetically satisfactory globe while for tumours of 16 mm or greater the figures were 32 out of 44 operations (73 per cent).

Post-operative Visual Acuity

The level of visual acuity after surgery is shown in Table I. As can be seen 65 per cent of cases retained useful vision of between 6/6 and Counting Fingers. Not unexpectedly the visual outcome was greatly influenced by the pre-operative size of the tumour. For tumours of up to 15mm in diameter 77 out of 108 (71 per cent) retained useful vision while for tumours of 16mm in diameter or over only 22 out of 44 cases (50 per cent) did so.

In relation to involvement of the ciliary body 61 patients out of 86 (71 per cent) without ciliary body involvement retained useful vision while only 40 out of 68 patients (59 per cent) in whom the ciliary body was involved did so.

In the case of posteriorly located tumours visual outcome was obviously related to whether or not the fovea was involved. Additionally the visual outcome was related to the pre-operative level of acuity. Overall, 60 out of 154 cases (39 per cent) retained an acuity within 2 Snellen lines of the pre-operative acuity.

Incidence of Complications

The commonest complications of surgery were post-operative vitreous haemorrhage, detachment of the retina or cataract.

Table I *Visual outcome after local resection of choroidal melanoma*

6/6-6/18	39	(25 per cent)
6/24-6/60	27	(17 per cent)
5/60-CF	35	(23 per cent)
HM-PL	13	(8 per cent)
NPL	6	(4 per cent)
Enucleation	34	(22 per cent)
No follow-up	3	(1 per cent)

Vitreous Haemorrhage: Overall 36 cases (23 per cent) developed significant post-operative vitreous haemorrhage. In the majority of these cases the haemorrhage cleared spontaneously (51 per cent) or after vitrectomy (19 per cent). In 6 cases vitreous haemorrhage was complicated by retinal detachment.

Retinal Detachment: There were 40 cases of retinal detachment (25 per cent). Twenty-three of these were operated upon, 10 successfully (43 per cent). Of the 23 operations, 13 were conventional retinal detachment procedures, 5 included vitrectomy and a further 5 vitrectomy together with silicone oil replacement of the vitreous. Two cases settled without surgery and 10 eyes underwent enucleation. For the last year, pre-operative pars plana vitrectomy has been used as part of the operative procedure to see whether this will reduce the incidence of post-operative traction retinal detachment.

Cataract: Cataract was mainly a complication of surgical resection of tumours affecting the ciliary body, 43 out of 70 such cases (61 per cent) developing cataract (20 cases) or undergoing per-operative lensectomy (23 cases). For tumours not involving the ciliary body only 13 out of 87 cases (15 per cent) developed cataract or were aphakic and one of these was aphakic prior to the surgery.

Residual and Recurrent Tumours

Following surgery about one third of patients show pigmented lesions on the edge of the surgical coloboma. Some of these represent residual tumour and others choroidal haemorrhage, pigment epithelial hyperplasia, haemato-macrophages or melano macrophages. It is our practice to treat all suspicious lesions either with low-energy, long-exposure laser or 106 Ruthenium/Rhodium plaque therapy or a combination of these modalities. Twenty-seven cases (17 per cent) required enucleation of the eye for residual or

recurrent tumour. Fifty-three per cent of eyes treated for residual or recurrent tumour have apparently done well. Significant orbital recurrence requiring major orbital surgery and radiotherapy occurred in two cases. Jensen[2] in his follow-up of cases treated by enucleation in Denmark noted orbital recurrence in 2.5 per cent of cases managed by enucleation.

Summary of Results

Local surgical resection allows the retention of a cosmetically satisfactory globe in about 80 per cent of cases and useful vision in about two thirds. The complication rate is increased and visual outcome poor for tumours of 16 mm in diameter or over or where the ciliary body is extensively involved.

Survival

Undoubtedly the major criterion in deciding whether local surgical resection is an appropriate form of management is the mortality following the procedure in relation to other forms of management. To date there are no valid statistical comparisons available and it is only recently that we have had a long enough follow-up on a sufficient number of patients treated by local resection to make any comparisons of mortality data.

Overall, survival at 5 years after local resection of choroidal melanoma was 26 out of 33 cases (79 per cent). The mortality rate of 21 per cent however includes at least one non tumour related death. In comparison the 5 year mortality rate in cases treated by enucleation was 54 per cent (102 deaths in 188 cases). This figure includes 13 non tumour deaths making the tumour related mortality 47 per cent (89 deaths in 188 cases).

Survival after local resection is greatly influenced by the pre-operative size of the tumour. For tumours up to 15 mm in diameter the mortality rate at 5 years was 11.6 per cent and for tumours of 16 mm or over the mortality was 57 per cent. In the group treated by enucleation tumours of up to 15 mm in diameter showed a 5 year mortality of 30 per cent, while for tumours over 16 mm in diameter, the 5 year mortality was 65 per cent.

Although preliminary actuarial curves for survival have shown an increased mortality in the group of 241 cases managed by enucleation as compared with the 157 cases managed by local resection the apparent difference may lie in the differing age composition of the two groups, patients undergoing enucleation being significantly older (61 ± 13.8 years) than those treated by local resection (50 ± 13.75 years). The mean size of the tumour in the two groups was however identical (13.3 ± 4 mm maximum diameter).

At present our material is undergoing more complete evaluation and in particular actuarial survival curves are being calculated for patients managed by local resection and those treated by enucleation taking into account the various factors known to affect the prognosis. A detailed statistical analysis of the material will be published elsewhere.

Conclusion

From the results so far, it appears that for choroidal tumours of up to 15 mm in diameter, particularly if not involving the ciliary body, management by local surgical resection remains more attractive than the alternative of enucleation and does not appear to be associated with any increased mortality. For larger tumours the complication rate is increased, the likely visual benefit is reduced and mortality is significant, although again not more so than in cases managed by enucleation. Such larger tumours should probably not be treated by local resection unless the eye involved is effectively the only eye.

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