CLINICAL STUDY

# Surgical excision of subfoveal neovascular membranes

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**Abstract**

***Background*** **Subfoveal choroidal neovascular membranes (CNV) are a cause of significant visual impairment. Laser treatment of such lesions results in visual loss. Surgical excision of CNV may allow stabilisation or improvement of vision. A series of results of surgical excision are presented.**

***Methods*** **The records for 43 eyes of 40 consecutive patients undergoing surgical excision of CNV not associated with age-related macular degeneration (AMD) were reviewed retrospectively. Statistical analyses of the relationship between pre-operative factors and post-operative visual results were made. Improvement or worsening of visual acuity was defined as a change of more than 2 lines of Snellen acuity.**

***Results*** **In 79.1% of patients visual acuity was improved or unchanged following surgery, and in 20.9% there was a reduction of Snellen acuity. There was no statistically significant association between visual outcome and age, gender, duration of visual symptoms, cause of CNV, presence of subretinal haemorrhage, elevation of retina by subretinal fluid, prior laser surgery, or the presence of pre-operative or intraoperative subretinal haemorrhage. There was a possible association between the non-use of gas tamponade and an increased chance of reduced vision. Visual loss was more likely in those eyes with good pre-operative visual acuity. Recurrence of CNV was noted in 10 (23%) eyes; repeat surgery was not associated with a worse visual outcome.**

***Conclusions*** **Surgical excision of CNV not related to AMD is a promising technique. More meaningful assessment of visual function in these patients will allow refinement of case selection.**

*Key words* Choroidal neovascular membranes

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Subretinal neovascular membranes may complicate a variety of conditions, but they occur most commonly in age-related macular degeneration (AMD). AMD is the most common cause of blindness in the western world, accounting for approximately 50% of blind registrations in the UK and North America.[1–3] Choroidal new vessel formation is a frequent feature of this condition,[4] and carries a particularly poor prognosis, generally leading to a marked loss of central vision. Although CNV occur in only 10% of those with AMD, 90% of those registered blind with the condition have this complication.[5,6] When CNV underlie the fovea, visual acuity falls to 6/60 or worse in 70% of those affected over a 2 year period.[7]

Although laser photocoagulation is efficacious in treating extrafoveal CNV,[8,9] 80% of presenting CNV are untreatable with laser because they already lie beneath the fovea.[10,11] The laser treatment of subfoveal CNV has been advocated to reduce the final extent of the central vision loss,[12,13] but this treatment produces an immediate drop in visual acuity that averages 3 Snellen lines, and as a consequence such treatment is rarely offered in the UK.

The treatment of subfoveal CNV with biological response modifiers has been advocated. Pilot studies using interferon-alpha 2a for CNV associated with AMD have given equivocal results.[14–16] Side-effects from this agent are almost universal, and may be severe.[15,17,18]

Techniques for the surgical excision of subfoveal CNV have been developed and refined over the last decade.[19–24] In 1988 DeJuan and Machemer[19] reported a small series of patients in whom submacular neovascular membranes related to AMD had been surgically excised via a large retinotomy. The visual results were very modest, and there were complications from proliferation associated with the large retinotomy; however, this work did demonstrate that surgical excision was feasible. In 1991 Thomas and Kaplan[20] removed subfoveal neovascular membranes from two patients with presumed ocular histoplasmosis syndrome (POHS) using a small retinotomy. The visual results were excellent, recorded at 20/20 and 20/40. The reported visual outcome from excision of CNV in conditions other than AMD has since been encouraging, although in the setting of AMD, numerically a far more common cause of CNV, the visual improvement



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from surgery is much more modest.[21–24] The difference in outcome for these two groups has been ascribed to the loss of retinal pigment epithelium (RPE) that occurs when CNV associated with AMD are excised, reflecting the diffuse RPE disease and multiple CNV ingrowth sites in this disease.[23] In idiopathic and inflammatory CNV the underlying RPE is better preserved, and the CNV usually has a single ingrowth site, allowing preservation of RPE during surgical excision and hence a better visual result.

To date there have been few reports of large series of patients undergoing surgical excision of CNV. We have therefore analysed the data from our series to determine the relationship between pre-operative and perioperative factors, and visual outcome following surgery, since this may be of value in case selection and management.

## Methods

A retrospective analysis was made of a consecutive series of patients undergoing surgery for excision of subfoveal CNV not related to AMD.

The diagnosis of CNV was based on clinical appearance using slit-lamp biomicroscopy supplemented by fluorescein angiography. A diagnosis of myopia was made if there was no other cause to explain the CNV, and the patient had 6 dioptres or more of myopia. A diagnosis of idiopathic CNV was made in the absence of significant myopia, signs of AMD, evidence of chorioretinal inflammation, or other causes of CNV.

All operations were carried out by the same surgeon (M.T.B.). The surgical technique was as follows: a three-port pars plana vitrectomy was performed using self-sealing scleral incisions; the posterior hyaloid was detached and removed. A stab retinotomy was made with a subretinal cannula in such a position as to give good access to the CNV whilst minimising any visual field loss. A small hydraulic macular detachment was induced prior to dissection and forceps removal of the CNV. Haemostasis was obtained by raising the intraocular pressure, this being facilitated by the self-sealing scleral incisions. The retina was examined for entry-site or other peripheral breaks prior to closure. Gas tamponade with air or $SF_6$ was used routinely for cases early in the series, but only if retinal breaks were noted for the latter part of the series.

When possible, patients were seen at 1 week, 1 month, 2–3 months and 6 months post-operatively. Pre- and post-operative vision were assessed using the Snellen chart. To allow comparison with the series published by Thomas *et al.*,[23] the final visual acuity was described as 'unchanged' where the post-operative visual result was equal to, or within 2 Snellen lines of, the pre-operative visual acuity. Vision was described as 'improved' or 'worsened' where at least 3 Snellen lines were gained or lost respectively.

## Results

Forty-three eyes of 40 patients are presented here. The patients' ages ranged from 16 to 68 years with a mean (± SD) of 39.8 (± 14.3) years. Of these, 32 (80%) were female. The mean duration of symptoms at presentation was 23 (± 20) weeks.

Of the 43 eyes, 16 (37%) were of inflammatory aetiology, 14 (33%) were judged to be idiopathic, and 9 (21%) were myopic (Figs. 1–3). There were also 2 eyes with dominant drusen, one with angioid streaks, and one with adult vitelliform dystrophy (Table 1).

Ten (23%) patients were noted to have significant elevation of the macula by subretinal fluid (sufficient to produce a convex elevation of the retina). There was pre-operative subretinal haemorrhage in 14 eyes (33%). Six eyes (14%) had undergone laser treatment of the CNV prior to surgical excision. One patient had undergone a previous buckling procedure for retinal detachment.

Gas tamponade with air or $SF_6$ was used in 21 (49%) of the 43 vitrectomy procedures.

Mean follow-up was 5 months in the surgical vitreoretinal clinic, ranging from 2 weeks to 16 months.

At final follow-up 6 eyes (14%) had gained an improvement in visual acuity of 3 Snellen lines or more. Nine of the operated eyes (20.9%) experienced a worsening of vision, and the remaining 28 (65.1%) demonstrated no significant alteration in visual acuity (Fig. 4).

There was no statistically significant association between visual outcome and gender ($\chi^2 = 1.503$, $p = 0.4718$) or age ($\chi^2 = 2.32$, $p = 0.6769$). The age categories examined were age less than 30 years, 30–50 years, or greater than 50 years. There was also no significant association between the duration of visual symptoms (less than 2 months: $\chi^2 = 1.128$, $p = 0.5688$; less than 6 weeks: $\chi^2 = 1.612$, $p = 0.466$; less than 4 weeks: $\chi^2 = 0.181$, $p = 0.9135$), underlying cause of CNV ($\chi^2 = 12.311$, $p = 0.2648$) (Fig. 5), presence of subretinal haemorrhage pre-operatively ($\chi^2 = 3.672$, $p = 0.1594$), substantial retinal elevation ($\chi^2 = 2.99$, $p = 0.2242$), prior laser treatment of the CNV ($\chi^2 = 1.911$, $p = 0.3846$), intraoperative subretinal haemorrhage ($\chi^2 = 1.082$, $p = 0.5821$) or recurrence of CNV ($\chi^2 = 0.417$, $p = 0.8118$).

The use of gas tamponade, either primarily to augment macular flattening or to tamponade retinal breaks, was not significantly associated with improved vision post-operatively using the above criteria ($\chi^2 = 2.105$, $p = 0.3491$). However, if one takes as 'improvement' or 'worsening' a change of 2 or more Snellen lines, a standard which has been used elsewhere,[21] then there is a significantly increased chance of reduced vision post-operatively if gas is not used ($\chi^2 = 7.894$, $p = 0.005$). The use of this more lax standard for post-operative visual change did not affect the statistical significance of the result for any other variable.

There was a statistically significant association between good pre-operative visual acuity (6/12 or better) and reduced vision post-operatively ($\chi^2 = 17.74$, $p = 0.0014$).

**Table 1.** *Details of patients undergoing subfoveal surgery*

| Patient no. | Sex | Age at diagnosis (years) | Diagnosis | Duration of symptoms | Pre-op. VA | Final VA | Recurrence |
|---|---|---|---|---|---|---|---|
| 1 | F | 21 | Punctate inner choroidopathy | 6/52 | 6/24 | CF | Yes at 3 months |
| 2 | F | 21 | Punctate inner choroidopathy | 4/12 | 6/24 | 6/18 | No |
| 3 | F | 26 | Punctate inner choroidopathy | 2/12 | 6/18 | CF | No |
| 4 | F | 33 | Multifocal choroiditis | 3/12 | CF | 6/18 | No |
| 5 | F | 44 | Punctate inner choroidopathy | 3/12 | 6/9 | 6/36 | No |
| 6 | M | 68 | Multifocal choroiditis | 6/12 | 6/60 | 6/60 | No |
| 7 | M | 49 | Multifocal choroiditis | 2/52 | 6/36 | 6/60 | No |
| 8 | F | 25 | Multifocal choroiditis | 1/12 | CF | 6/18 | No |
| 9 | F | 32 | Multifocal choroiditis | 2/12 | CF | 6/9 | Yes at 12 months |
| 10 | F | 39 | Multifocal choroiditis | 14/12 | 6/18 | 6/9 | No |
| 11 | F | 22 | Punctate inner choroidopathy | 2/12 | 6/18 | 6/36 | Yes at 9 months |
| 12 | F | 27 | POHS | 2/12 | 6/18 | CF | Yes at 1 month |
| 13 | F | 31 | Punctate inner choroidopathy | 7/12 | 6/24 | 6/18 | No |
| 14 | F | 29 | Punctate inner choroidopathy | 4/12 | 6/36 | CF | No |
| 15 | M | 49 | Toxoplasmosis | 2/52 | 6/18 | 6/60 | No |
| 16 | F | 16 | Intermediate uveitis | 18/12 | CF | CF | No |
| 17 | F | 32 | Idiopathic | 3/52 | 6/60 | 6/12 | No |
| 18 | M | 32 | Idiopathic | 7/12 | 6/36 | 6/18 | No |
| 19 | M | 40 | Idiopathic | 22/12 | 6/18 | 6/60 | No |
| 20 | M | 38 | Idiopathic | 6/12 | 6/9 | 6/12 | Yes at 2 months |
| 21 | F | 57 | Idiopathic | 3/12 | 6/24 | 6/9 | No |
| 22 | F | 60 | Idiopathic | 4/12 | 6/12 | CF | Yes at 4 months |
| 23 | F | 51 | Idiopathic | 6/12 | 6/36 | 6/24 | No |
| 24 | F | 59 | Idiopathic | 1/12 | 6/36 | 6/24 | Yes at 5 months |
| 25 | F | 34 | Idiopathic | 5/12 | 6/36 | 6/36 | Yes at 4 months |
| 26 | F | 32 | Idiopathic | 2/52 | CF | CF | Yes at 3 weeks |
| 27 | F | 51 | Idiopathic | 7/12 | 6/36 | CF | No |
| 28 | M | 41 | Idiopathic | 10/12 | CF | CF | No |
| 29 | F | 37 | Idiopathic | 5/12 | 6/60 | CF | No |
| 30 | M | 51 | Idiopathic | 12/12 | 6/36 | CF | No |
| 31 | F | 67 | Myopia | 9/12 | 6/60 | 6/36 | No |
| 32 | F | 67 | Myopia | 5/12 | 6/60 | 6/18 | No |
| 33 | F | 32 | Myopia | 8/12 | 6/24 | 6/18 | No |
| 34 | F | 18 | Myopia | 11/12 | CF | CF | No |
| 35 | F | 23 | Myopia | 7/12 | 6/36 | CF | No |
| 36 | F | 35 | Myopia | 3/12 | HM | HM | No |
| 37 | F | 57 | Myopia | 11/12 | 6/12 | 6/60 | No |
| 38 | F | 42 | Myopia | 6/12 | CF | 6/60 | No |
| 39 | F | 44 | Myopia | 6/12 | 6/24 | 6/24 | Yes at 11 months |
| 40 | M | 56 | Angioid streaks | 10/12 | 6/9 | HM | No |
| 41 | M | 33 | Dominant drusen | 2/52 | 6/18 | 6/36 | No |
| 42 | M | 31 | Dominant drusen | 2/12 | 6/60 | 6/9 | No |
| 43 | F | 61 | Vitelliform dystrophy | 2/12 | 6/24 | 6/36 | No |

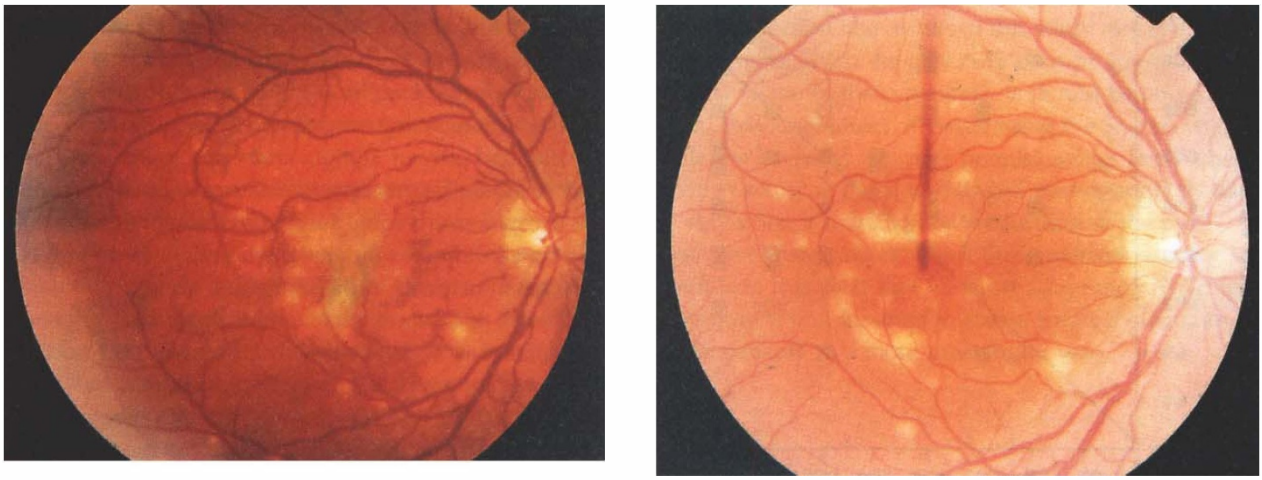
VA, visual acuity; POHS, presumed ocular histoplasmosis syndrome.

Recurrence of CNV was noted in 10 (23%) of eyes. Of these, 8 underwent repeat vitrectomy and excision of the recurrent membrane. In one patient there was a further recurrence and a third vitrectomy with removal of CNV was performed. Repeat surgery was not found to be a predictor of poor outcome; 2 of the patients undergoing excision of recurrent CNV had achieved more than 3 Snellen lines of visual improvement at last follow-up.

Complications of the primary surgery included subretinal haemorrhage in 6 (14%) eyes, although this was in no case considered clinically significant; cataract presumed secondary to lens touch or gas tamponade in 2 eyes, which later underwent uncomplicated phacoemulsification with lens implant; and one case of endophthalmitis (case 36), which was culture negative and which settled upon treatment with intracameral antibiotics. There were two entry-site breaks that were successfully treated with cryotherapy and gas tamponade at the time of the primary surgery. One myopic patient suffered a retinal detachment with a single horse-shoe tear unrelated to the vitrectomy entry-sites. This was successfully treated with a cryotherapy and scleral buckling.

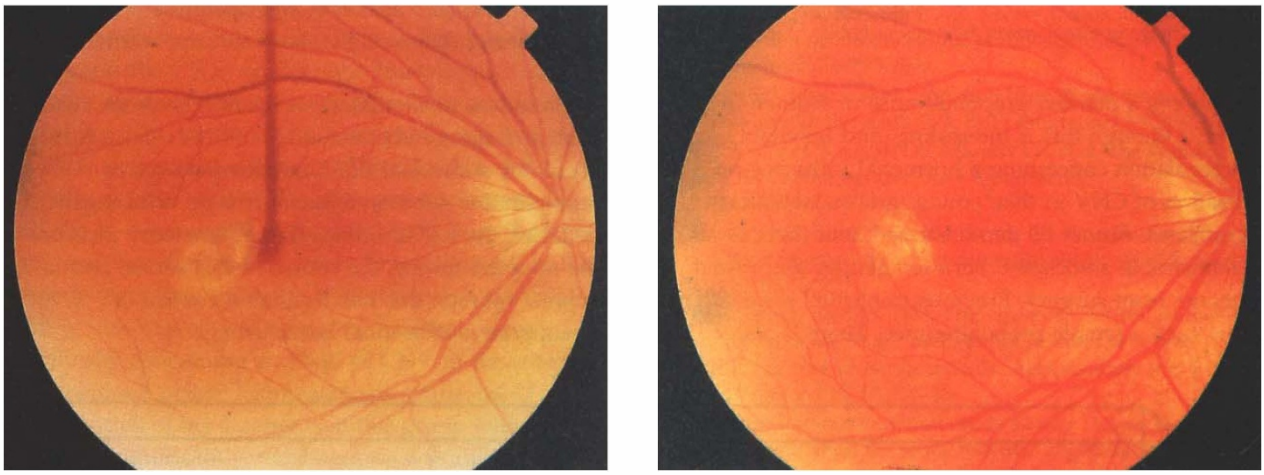
## Discussion

This is a retrospective study with the limitations entailed therein. There is a relatively short follow-up period since patients were rapidly transferred post-operatively from the surgical vitreoretinal clinic back to the referring medical retina clinics, or to distant referral centres, and we have tried to use only data that we have verified ourselves. A longer-term analysis of a battery of psychovisual parameters is currently under way and will be published separately.



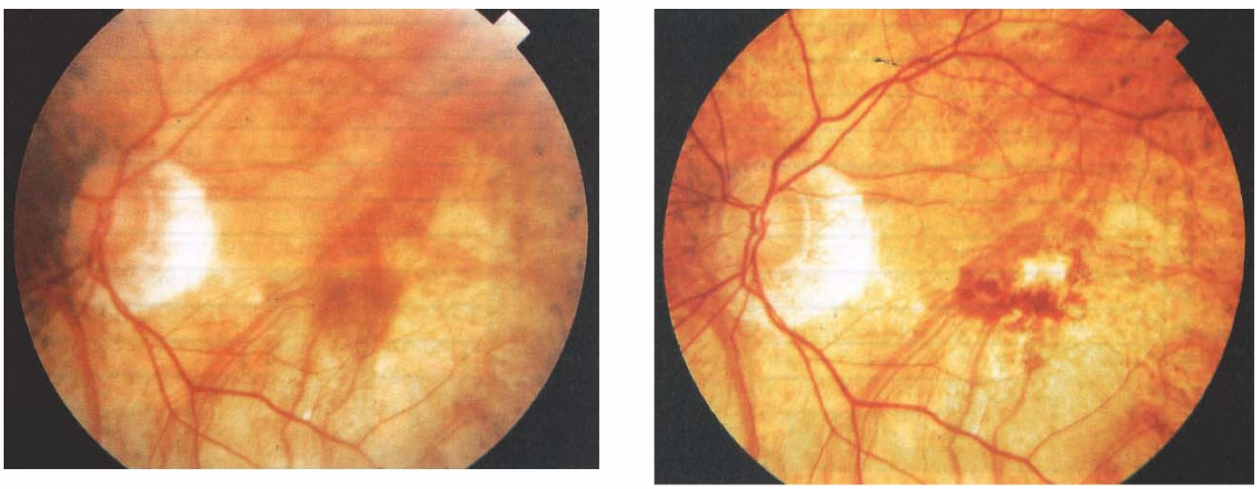
(a) (b)

**Fig. 1.** *(a) Pre-operative photograph of a CNV secondary to multifocal choroiditis. (b) Same eye as (a) 1 month after surgical excision of CNV. Vision is 6/9.*



(a) (b)

**Fig. 2.** *(a) Pre-operative photograph of an idiopathic CNV. (b) Same eye as (a) 1 month after surgical excision of CNV. Vision is 6/9 despite juxtafoveal retinal pigment epithelium (RPE) loss.*



(a) (b)

**Fig. 3.** *(a) Pre-operative photograph of a CNV in a highly myopic eye. (b) Same eye as (a) 1 week after surgical excision of CNV. Note the associated RPE loss and subretinal haemorrhage.*

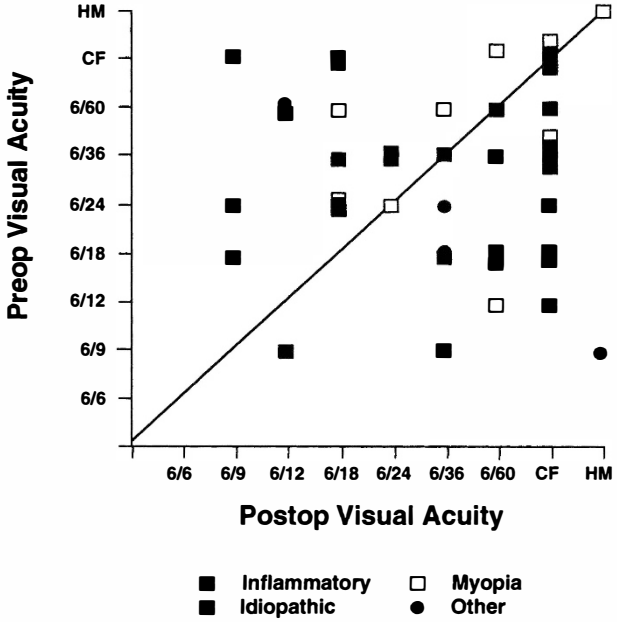



**Fig. 4.** *Change in visual acuity following surgery.*

There is a marked preponderance of women in this series. Although this is interesting, and inevitably leads to speculation concerning a hormonal influence on causation of CNV in this 'young' group, statistical significance cannot be demonstrated, and there is no demonstrable association between gender and visual outcome from surgery. Previous published series do not show such a female preponderance. There is also a relatively high proportion of myopes in this series. It has been reckoned that this subgroup does not generally fare well with surgical excision of CNV, although we were unable to demonstrate a statistically significant association between myopia and visual outcome. This may relate to the retrospective nature of our study, since the myopic group could have contained patients with less than 6 dioptres of myopia, who might more properly have been included in the idiopathic group.

Overall 80% of patients were unchanged or improved with regard to their Snellen visual acuity. This study is uncontrolled, and it is known that some patients with idiopathic CNV or CNV secondary to intraocular inflammation may show some degree of spontaneous improvement;[25] nevertheless, the overall trend for patients with recent-onset subfoveal CNV is for worsening of central vision, and the result of this study is therefore encouraging. Furthermore, the series necessarily includes the authors' 'learning curve', in terms of both case selection and operative management, and a further series might show an improvement in results.

There was no statistical correlation between visual result and age, gender, aetiology of CNV, elevation of the macula by subretinal fluid, or pre-operative or intraoperative subretinal haemorrhage. With regard to the latter, the use of self-sealing sclerostomy incisions was adopted during the course of this series, and in the authors' opinion this has facilitated control of intraoperative subretinal haemorrhage.

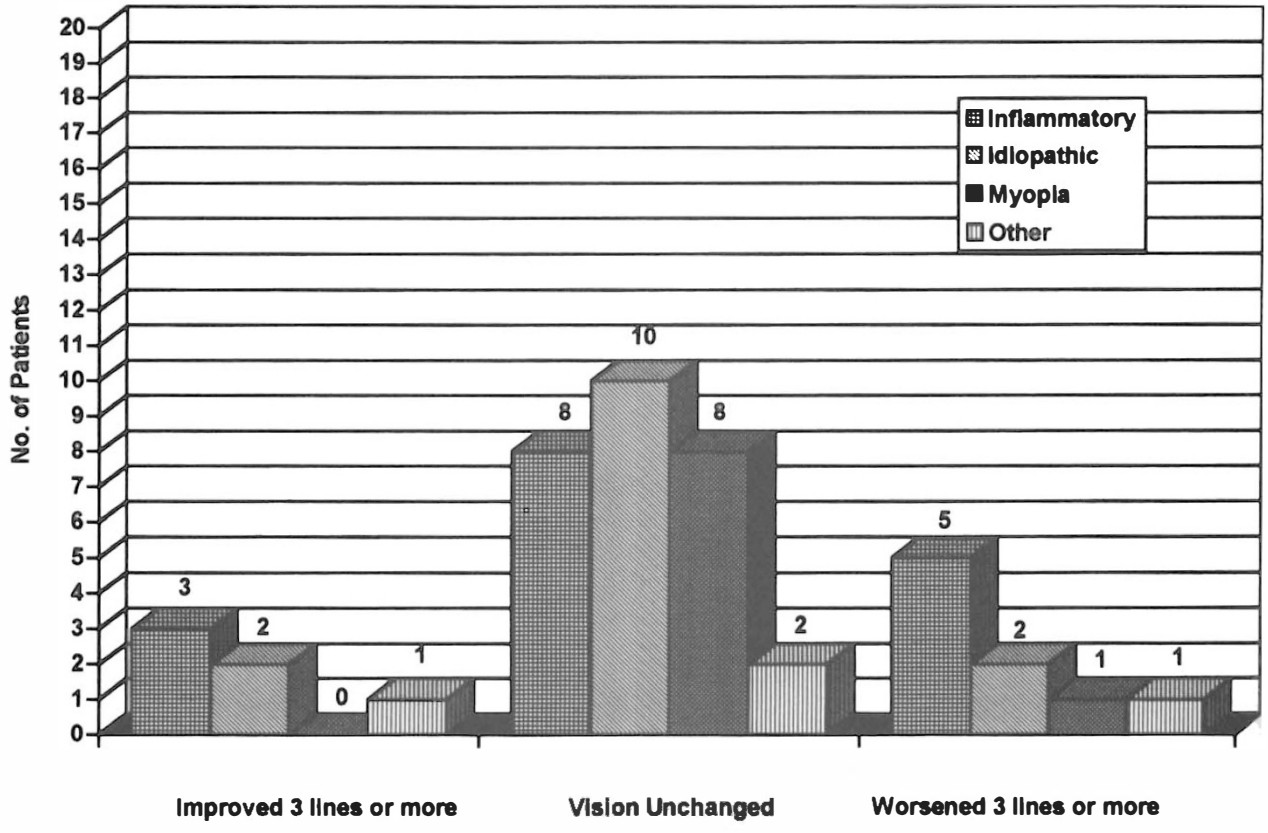



**Fig. 5.** *Improvement in Snellen visual acuity according to diagnosis.*

Pre-operative laser treatment of the CNV was not statistically associated with an unfavourable visual outcome, but this did make excision of the membrane more difficult because of adhesions between the CNV and surrounding tissues.

The issue of intraoperative gas tamponade is interesting: there is a suggestion of an association between non-use of gas tamponade and an unfavourable visual outcome. In a randomised controlled trial of pneumatic retinopexy versus scleral buckling for the treatment of rhegmatogenous retinal detachment[26] it was noted that for detachments that had been macula-off for 14 days or less there was a more rapid restoration of vision and a significantly better visual acuity at 6 months after surgery in the pneumatic retinopexy group. This may relate to a more rapid reattachment of the macula in these eyes, and if our suggested association is indeed a true one then a similar mechanism could apply, since the macula in eyes with CNV is in any case frequently elevated by subretinal fluid, and the surgical protocol involves induction of a hydraulic macular detachment to gain access the CNV via the subretinal space.

There appears to be an association between good pre-operative visual acuity and a poor post-operative visual result. Interpretation of this is difficult, since, for example, an eye with 6/12 vision pre-operatively is unlikely to achieve 6/5 post-operatively even if all goes well, and therefore in this group 'improvement' at the 3-line level is very unlikely. Nevertheless, a similar finding was made by Berger *et al.*[27] in their report specifically concerning excision of CNV in the setting of the presumed ocular histoplasmosis syndrome. Table 1 indicates that of the 4 patients in this group whose vision worsened significantly, the diagnosis was angioid streaks in one and myopia in another (diagnoses reported elsewhere to be associated with a poor visual outcome[23]); in a third case a recurrence of the CNV became apparent by 4 months. However, if one considers Snellen visual acuity in isolation, then it might be appropriate for surgeons to temper any enthusiasm for surgical excision of CNV in patients with visual acuity of 6/12 or better.

The observed recurrence rate of 23% compares favourably with that observed for laser treatment of idiopathic CNV or CNV associated with the presumed ocular histoplasmosis syndrome,[9,28] although allowance must be made for the relatively short follow-up in this study. The recurrence rates reported by Thomas *et al.*[23] are similarly favourable. In the authors' experience excised CNV are almost always found at surgery to be larger than predicted pre-operatively by clinical or angiographic appearance. It is the authors' view that the observed reduced recurrence rate following surgery is real and is due to the undertreatment of CNV with laser because of an underestimation of the size of the membrane resulting from misleading clinical or angiographic appearances.

The rate of surgical complications encountered during this series is similar to that reported for vitrectomy procedures in general.

In conclusion, the results of this study must be seen as encouraging given the generally poor prognosis for central vision in these patients. It should be borne in mind that assessment of vision using the Snellen chart in isolation is crude, and may be misleading. Even when Snellen acuity appears unchanged post-operatively there is very often a reduction or eradication of the pre-operative distortion of which these patients usually complain. It is clear that we must adopt more valid tests of central visual function to assess surgical outcomes for these patients in a more meaningful way.

## References


1. National Society to Prevent Blindness. Vision problems in the United States: a statistical analysis prepared by Operational Research Development. New York, 1980.
2. Grey RHB, Burns-Cox CJ, Hughes A. Blind and partially-sighted registration in Avon. Br J Ophthalmol 1989;73:988–94.
3. Thompson JR, Rosenthal AR. Recent trends in the registration of blindness and partial sight in Leicester. Br J Ophthalmol 1989;73:95–9.
4. Sarks SH. New vessel formation beneath the retinal pigment epithelium in the senile eye. Br J Ophthalmol 1973;57:951–65.
5. Leibowitz H, Kreuger DE, Mauder LR, *et al.* The Framingham Eye Study Monograph. Surv Ophthalmol 1980;24(Suppl):335–610.
6. Hyman LG, Lilienfield AM, Ferris FL, Fine SL. Senile macular degeneration: a case–control study. Am J Epidemiol 1985;118:213–27.
7. Bressler SB, Bressler NM, Fine SL, *et al.* Natural course of choroidal neovascular membranes within the foveal avascular zone in senile macular degeneration. Am J Ophthalmol 1982;93:157–63.
8. Macular Photocoagulation Study Group. Argon laser photocoagulation for senile macular degeneration: results of a randomised clinical trial. Arch Ophthalmol 1982;100:912–8.
9. Macular Photocoagulation Study Group. Argon laser photocoagulation for neovascular maculopathy: five-year results from randomised clinical trials. Arch Ophthalmol 1991;109:1109-14.
10. Grey RHB, Bird AC, Chisholm I. Senile disciform macular degeneration: features indicating suitability for photocoagulation. Br J Ophthalmol 1979;63:85–9.
11. Bressler NM, Bressler SB, Gragoudas ES. Clinical characteristics of choroidal neovascular membranes. Arch Ophthalmol 1987;105:209–13.
12. Macular Photocoagulation Study Group. Laser photocoagulation of subfoveal neovascular lesions in age-related macular degeneration. Arch Ophthalmol 1991;109:1220–31.
13. Macular Photocoagulation Study Group. Laser photocoagulation of subfoveal neovascular lesions of age-related macular degeneration. Arch Ophthalmol 1993;111:1200–9.
14. Fung WE. Interferon alpha 2a for treatment of age-related macular degeneration. Am J Ophthalmol 1991;112:349–50.
15. Gillies MC, Sarks JP, Beaumont PE, *et al.* Treatment of choroidal neovascularization in age-related macular degeneration with interferon alpha-2a and alpha-2b. Br J Ophthalmol 1993;77:759–65.
16. Kirkpatrick JNP, Dick AD, Forrester JV. Clinical experience with interferon alpha 2a for exudative age-related macular degeneration. Br J Ophthalmol 1993;77:766–70.
17. Koeller JM. Biologic response modifiers: the interferon alpha experience. Am J Hosp Pharm 1989;46(Suppl):S11–5.

18. Chan CK, Kempin SJ, Noble SK, Palmer GA. The treatment of choroidal neovascular membranes by alpha interferon: an efficacy and toxicity study. Ophthalmology 1994;101:289–300.
19. DeJuan E, Machemer R. Vitreous surgery for hemorrhagic and fibrous complications of age-related macular degeneration. Am J Ophthalmol 1988;105:25–9.
20. Thomas MA, Kaplan HJ. Surgical removal of subfoveal neovascularization in the presumed ocular histoplasmosis syndrome. Am J Ophthalmol 1991;111:1–7.
21. Thomas MA, Grand G, Williams DF, *et al*. Surgical management of sub-foveal neovascular membranes. Ophthalmology 1992;99:952–68.
22. Lambert HM, Capone A, Aaberg TM, *et al*. Surgical excision of subfoveal neovascular membranes in age-related macular degeneration. Am J Ophthalmol 1991;113:257–62.
23. Thomas MA, Dickinson JD, Melberg NS, *et al*. Visual results after surgical removal of subfoveal neovascular membranes. Ophthalmology 1994;101:1384–96.
24. Ormerod LD, Puklin JE, Frank RN. Long-term outcomes after the surgical removal of advanced subfoveal neovascular membranes in age-related macular degeneration. Ophthalmology 1994;101:1201–10.
25. Brown J, Folk JC, Reddy CV, Kimura AE. Visual prognosis of multifocal choroiditis, punctate inner choroidopathy, and the diffuse subretinal fibrosis syndrome. Ophthalmology 1996;103:1100–5.
26. Tornambe PE, Hilton GF, *et al*. Pneumatic retinopexy: a multicenter randomized controlled clinical trial comparing pneumatic retinopexy with scleral buckling. Ophthalmology 1989;96:772–84.
27. Berger AS, Conway M, Del Priore LV, Walker RS, Pollack JS, Kaplan HJ. Submacular surgery for subfoveal choroidal neovascular membranes in patients with presumed ocular histoplasmosis syndrome. Arch Ophthalmol 1997;115:991–6.
28. Macular Photocoagulation Study Group. Recurrent choroidal neovascularization after argon laser photocoagulation for neovascular maculopathy. Arch Ophthalmol 1986;104:503–12.