Exploring Sex and Laterality Imbalances in Patients Undergoing Laser Retinopexy

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IMPORTANCE Studies have consistently reported a small preponderance of rhegmatogenous retinal detachments in males and in right eyes, which might suggest interesting differences in ocular anatomy relating to sex and laterality. However, an important potential confounding factor is that epidemiologic studies do not consider retinal tears that do not lead to detachment. This study used the electronic patient records from a large eye hospital to explore whether any sex and laterality imbalances were present in patients who underwent laser retinopexy.

OBSERVATIONS Analysis was conducted from December 1, 2014, to March 1, 2015. Of 6760 patients who underwent retinopexy between May 21, 1996, and October 27, 2014, sex had been recorded for 5854 patients (3346 males and 2508 females) and laterality recorded for 3780 eyes (1990 treatments in the right eye and 1790 in the left eye). The proportion of males was 57.2% (95% CI, 55.9%-58.4%) and the proportion of right eyes was 52.6% (95% CI, 51.1%-54.2%). For sex and laterality, the 95% CIs did not overlap the 50% mark, indicating that the imbalance was likely not owing to chance.

CONCLUSIONS AND RELEVANCE Our study showed that laser retinopexy was performed more often in males and in right eyes. This imbalance is in the same direction as that seen for retinal detachments, suggesting that males and right eyes may have an anatomical predisposition toward retinal tears and detachment, possibly related to a slightly greater average axial length.

Several studies over the past few decades have shown a small but statistically significant preponderance in rhegmatogenous retinal detachments in males and in right eyes.1-3 This preponderance persists even after exclusion of patients with pseudophakia or cases relating to trauma.4 Myopia, with its associated increase in axial length, is a strong risk factor for retinal detachment.4 Males on average may have longer axial lengths than females,1,5 and differences between the sexes have also been shown in the anatomy of the posterior vitreous base.5

Various explanations have been proposed for the laterality imbalance, including the differing routes of blood supply to both eyes1 or an asymmetric effect of reading saccades5 when language is read from left to right (although populations reading right to left have been suggested to show a similarly directed asymmetry7). It is possible that right eyes are longer than left eyes on average; recent findings from several large normative cohorts suggest this difference may be the case.8

However, an important potential confounding factor relates to retinal breaks that are treated (usually with laser retinopexy) to prevent the development of retinal detachment. If, for example, males and females are affected equally by such breaks but females are more likely to seek ophthalmologic care before the development of retinal detachment, then epidemiologic studies of retinal detachment will show an excess of males, not owing to any difference in anatomical risk factors but simply because of differences in the likelihood of seeking medical attention. Studies in other fields have shown that males are more likely to delay seeking medical attention,9,10 so it is plausible that a similar effect may apply to seeking ophthalmologic care. In the case of laterality imbalance, if both right and left eyes were equally likely to develop retinal breaks, but left eyes were, for some reason, more likely to be treated by laser retinopexy to prevent detachment, a right-sided preponderance in retinal detachment prevalence would result.

We therefore sought to explore whether a sex or laterality imbalance might be apparent in patients undergoing laser retinopexy and whether any imbalance was in the same direction as that seen in retinal detachments. As the difference in interocular incidence is small, large numbers of patients are required to achieve sufficient power. We searched the electronic records of a large eye hospital to determine whether any asymmetries or sex imbalances could be detected among patients undergoing laser retinopexy.
Methods

Moorfields Eye Hospital has an electronic database in which laser treatments are routinely recorded. The database was retrospectively searched for all retinopexy treatments performed between May 21, 1996, and October 27, 2014. Analysis was conducted from December 1, 2014, to March 1, 2015. Duplicate identification numbers (cases in which patients had more than 1 treatment in 1 eye) were excluded, so that each eye was counted only once (for the right-left comparison) and each patient was counted only once (for the male-female comparison). Cases in which the laterality was unspecified were excluded from the right-left analysis, and cases in which the sex was not recorded were excluded from the male-female comparison.

The proportions of right eyes and males were calculated. If the 95% CI for each proportion did not cross the 50% mark, it was indicative of a difference that was likely not owing to chance. The study involved retrospective review of clinical data already acquired and therefore did not require formal ethics committee review according to the United Kingdom’s Governance Arrangements for Research Ethics Committees.

Results

More than 140,000 laser treatments had been entered into the electronic database during the 18-year study period. Of these treatments, 6,760 were in patients who underwent retinopexy. Sex had been recorded in 5,854 patients; 3,346 were male and 2,508 were female. Thus, the proportion of males was 57.2% (95% CI, 55.9%-58.4%) and the ratio of males to females was 1.33:1.

Eye laterality was documented in 3,780 cases; 1,990 treatments were in the right eye and 1,790 were in the left eye. Thus, the proportion of right eyes was 52.6% (95% CI, 51.1%-54.2%) and the ratio of right eyes to left eyes was 1.11:1.

Discussion

This study aimed to ascertain whether any imbalance in sex or laterality could be discerned in retinopexies and to explore whether any such finding was in the same, or opposite, direction to that seen in epidemiologic studies of retinal detachment. In the electronic records of patients undergoing laser retinopexy, as in the records of patients with retinal detachment, there appears to be a statistically significant preponderance of males and right eyes. Thus, the difference appears to be real and not owing to behavioral differences, such as sex differences in the likelihood of seeking prompt medical attention.

A large meta-analysis of previous retinal detachment studies found the proportion of males to be 55% (95% CI, 52%-59%) and the proportion of right eyes to be 55% (95% CI, 53%-56%). In our study and the meta-analysis, the 95% CIs overlap and do not cross the 50% mark, indicating that the imbalances are likely not owing to chance, and are in the same direction for retinopexies and retinal detachments.

Conclusions

Our study showed a small excess of males and of right eyes undergoing laser retinopexy. This imbalance is in the same direction as that seen for retinal detachments, suggesting that males and right eyes may have some predisposition, possibly anatomical, to retinal tears and detachment.
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