Exploring Sex and Laterality Imbalances in Patients Undergoing Laser Retinopexy

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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, 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.

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.

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.

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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.

At a Glance

- Previous epidemiologic studies have consistently reported a small excess of retinal detachments in males and right eyes.
- Studies have not considered retinal tears that are treated with laser retinopexy prior to detachment.
- Our study reviewed electronic records of patients undergoing laser retinopexy to explore any sex or laterality imbalances.
- We found similar imbalances in patients undergoing retinopexy (an excess of males and right eyes), suggesting that the previously reported sex and laterality differences are owing to real differences in the predisposition to retinal breaks.

A frequent limitation of retrospective studies, that of incomplete documentation, also applies to our study: the proportions only relate to cases in which sex or laterality was recorded. However, there is no particular reason to suspect any ascertainment bias in terms of recording of sex or laterality. The electronic database also recorded only the procedure but not the patient’s presenting symptoms or retinal findings. Thus, we cannot quantify how many patients had an acute retinal tear with typical symptoms relating to posterior vitreous detachment, which represents another potential limitation of the study.

The sex difference in retinal detachment and frequency of laser retinopexy might be related to a greater average axial length in males, but additional anatomical differences may play a role. A study of the posterior vitreous base in donor eyes found an age-dependent increase in the anteroposterior dimension that became wider in males compared with females. Also, several epidemiologic studies appear to show an excess of females affected by macular holes. Thus, it is likely that there may be sex differences in the vitreous structure or in the dynamics of the vitreoretinal interface, which may confer increased or decreased risk for various types of vitreoretinal conditions, beyond a simple effect of longer axial length.

The laterality difference in retinal detachment and frequency of laser retinopexy is intriguing. A recent study of large normative cohorts suggested that right eyes are on average longer than left eyes, thus finding a small but highly statistically significant difference. The difference also appeared to relate to eye dominance rather than right-left laterality per se. In individuals whose left eye is dominant, the difference in length appeared to be reversed (although with fewer individuals whose left eye is dominant, this finding was no longer statistically significant). What brings about this interocular asymmetry is unclear, but greater understanding of the mechanisms underlying small differences in the development of the eyes could shed light on the development of myopia and on the association between myopia and retinal detachment.
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REFERENCES