Which is more likely – microbial keratitis or retinal detachment?

This may seem an odd question, but when it comes to evidence based myopia management in practice, it’s a key part of understanding why we should care about myopia control. Two recent comments from colleagues set me on this track to find an answer in the literature.

1: “What’s the point of myopia control anyway? Is there any real difference between -3.00 and -4.00?”
2: “I believe that the risks of fitting OrthoK in kids outweights the myopia control benefits.”

These are important comments because the scientific data increasingly points towards contact lenses as our best option for myopia control. Embracing active myopia management in practice means embracing paediatric contact lens fitting. So is contact lens wear more dangerous than a higher level of myopia?

Off to my computer I went. Turns out the brilliant, prolific writer Ian Flitcroft had beaten me to it in a degree, publishing an astounding paper in 2012 which, amongst many other things, compares the odds ratios of myopic maculopathy, glaucoma, retinal detachment and cataract with increasing levels of myopia with more widely understood odds of stroke and heart attack with hypertension. It wouldn’t be medically acceptable to leave a hypertensive person uncontrolled, with a systolic blood pressure of over 160 – the odds ratio of stroke is 3.2x compared to a normotensive. Exactly the same odds of retinal detachment in low myopes of -0.75 to -2.75D. Surprising? Those odds triple for -3.00 to -5.75D and go up to 21.5 once you hit 6D of myopia. Severity of strokes will vary, as will retinal detachment – both have the potential to be minor or catastrophic. Sobering statistics.

Flitcroft’s is an amazing paper, and a necessary read for anyone interested in the full picture on myopia, but at 38 pages you might want to print it off and work at it over a few reading sessions!

Odds ratios describe how strongly one condition is associated with another. Incidences, on the other hand, give us an idea of the absolute risk of a condition. As practitioners I think it’s fair to say that we are much more concerned about the imminent risk of microbial keratitis in our paediatric myope contact lens wearer than we are worried about their risk of retinal detachment after cataract surgery in 60 years time. The odds ratio for this increases by 0.92 for every diopter of myopia.²

Here’s where I’ve done a little bit of maths to give you an idea of the comparable risks of contact lens wear vs myopia complications, based on the following assumptions. When calculating the lifetime risk for suffering microbial keratitis once, I’ve generously assumed 50 years of contact lens wear; this likely overestimation means that any shorter duration of wear carries a lower risk. Of course it could happen more than once but I’ve not found any papers on risk of recurrence to help complete that picture. Glaucoma and myopic maculopathy have been treated as single occurrence conditions – once diagnosed they would be continuously managed – lifetime risk has been calculated on incidence rates from the literature. Retinal detachment annual incidence rates have been calculated to lifetime risk using the average life expectancy in Australia of 82 years (www.aihw.gov.au), and for myopia, assuming a mean age of onset of 15 years³ for a lifetime duration of myopia of 67 years.

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¹ www.aihw.gov.au
² MYOPIA CONTROL – MICROBIAL KERATITIS VS RETINAL DETACHMENT © KATE GIFFORD 2014
### Retinal detachment (any Rx)
- Annual incidence: 0.005% to 0.017%
- Lifetime risk: 1 in 243 to 1 in 71

### Retinal detachment in myopia
- Fourfold increase with 1 to 3D of myopia
- Ten-fold increase with 3 to 6D of myopia

### RD after cataract surgery
- 0.3% to 1.8% (any Rx, cumulative from 1 to 20 years after surgery)
- 2.4% in high myopes (axial length ≥26mm)

### Glaucoma
- 1.5% in emmetropes
- 4.2% in -1.00D or more

### Myopic maculopathy
- in myopia under 5D: 0.42% prevalence
- in myopia greater than 5D: 25.3% prevalence

### Microbial keratitis in the non contact lens wearing population
- 0.014%

### Microbial keratitis with contact lens wear
- Daily wear DD 0.02%
- Daily wear SiH 0.12%
- Extended wear SiH 0.25%
- Paediatric OrthoK 0.14%
- OrthoK (all ages) 0.07%

### Microbial keratitis with contact lens wear, resulting in a 2 line loss of BCVA
- Daily wear DD 0%
- Paediatric OrthoK 0%
- Daily wear SiH 0.01%
- Extended wear 0.03%

### Infiltrative keratitis (paediatric population, contact lens wear)
- Paediatric OrthoK 0.28%
- Daily wear, monthly SiH 0.65%

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**Some sobering comparisons on contact lens complications vs myopic pathology risks:**

- **Your paediatric daily disposable wearer who doesn’t progress past -3.00D is still three times more likely to have a retinal detachment in his/her lifetime than MK from daily disposable lenses.**
- **Your paediatric myope who progresses into the 3 to 6D bracket of myopia is equally likely to have a retinal detachment than to have a case of MK with OrthoK in their lifetime – and no loss of vision with the latter.**
- **The myope over 5D is nearly 4 times more likely to develop myopic maculopathy in their lifetime than MK from a lifetime of OrthoK or daily wear silicon hydrogel lenses.**
- **Glaucoma in a myope 1D or more is similarly likely to MK over a lifetime of OrthoK wear.**
• The annual risk of retinal detachment in the 3 to 6D myope is five times higher than their annual risk of MK from daily disposables, and on par with the risk of MK with paediatric OrthoK.

It’s easy to see that if your paediatric myope is actively managed, and does not progress past -3.00D, the ocular health risks are dramatically reduced. Lower myopia makes contact lens wear for myopia control riskier by comparison, but hopefully these numbers show you that the contact lens risks are not as bad as perhaps you’d thought. The key here is to look beyond the immediate risks of contact lens wear to the lifetime management of the patient. I’ve been pretty happy with my 1D of myopia over the last 15 years and I know I’ll be even more pleased with it come presbyopia; but it’s wrong to consider it benign. Flitcroft makes the convincing argument that there is no ‘physiological’ (implying safe) level of myopia where no additional pathological risks are carried over the emmetrope.

We must take myopia seriously, and utilize the wealth of scientific data available to actively manage myopia in our paediatric patients. Their future selves will thank you.

REFERENCES