

Is diabetes really a risk factor for acute eye infection?

Abdus Samad Ansari, Simon de Lusignan, Barbara Arrowsmith, William Hinton, Andrew McGovern

Department of Clinical and Experimental Medicine, University of Surrey, Guildford, UK



Aim

Diabetes increases risk of certain infections. However, its influence on eye infections is not well studied. We examined if diabetes was associated with increased risk of acute ocular infection.

Background

Research into the ocular manifestations of diabetes has focused on management of diabetic retinopathy and maculopathy due to the risk of proliferative retinal disease leading to blindness (1). Ocular infections however also pose a significant challenge for this population, affecting quality of life and contributing to a significant number of healthcare visits in both primary and secondary care

There remains a significant health service workload despite the low morbidity of these conditions. Almost 1% of all primary care consultations are due to conjunctivitis,(2,3) with more than five million episodes annually in the United States and 1 million in the United Kingdom (3). Identification of modifiable risk factors for eye infections could therefore provide targets for reduction of this disease burden.

Methods

Using the Royal College of General Practitioners Research and Surveillance Centre database (4), a retrospective cohort study was carried out over a six year period (5). We investigated infection incidence over a wide range of ocular infections; conjunctivitis, blepharitis, stye/chalazion, endophthalmitis, orbital cellulitis, infectious keratitis/keratoconjunctivitis, and lacrimal gland infections. A subset analysis was carried out on the population with diabetes to investigate the relationship between infection incidence and glycaemic control. Using the area under the curve we stratified patients by HbA1c levels (6): good (<52mmol), moderate (52-68mmol), poor (69-100mmol) and very poor (>100 mmol).

References

1. Gregg EW, Sattar N, Ali MK. The changing face of diabetes complications. *The Lancet Diabetes & Endocrinology*. 4(6): 537-47.
2. Dart JK. Eye disease at a community health centre. *British medical journal (Clinical research ed)*. 1986; 293(6560): 1477-80.
3. Royal College of General P, McCormick A, Fleming D, Charlton J, Great B, Office of Population C, et al. Morbidity statistics from general practice : fourth national study 1991-1992. London: H.M.S.O.; 1995
4. McGovern AP, Hinton W, Correa A, Munro N, Whyte M, de Lusignan S. Real-world evidence studies into treatment adherence, thresholds for intervention and disparities in treatment in people with type 2 diabetes in the UK. *BMJ Open* (2016). 6:e012801
5. Ansari AS, de Lusignan S, Arrowsmith B, Hinton W, Munro N, McGovern A. Association Between Diabetes, Level of Glycemic Control, and Eye Infection: A Cohort Study. *Diabetes Care* (2016) Dec; dc162320
6. Maple-Brown LJ, Ye C, Retnakaran R. Area-under-the-HbA1c-curve above the normal range and the prediction of microvascular outcomes: an analysis of data from the Diabetes Control and Complications Trial. *Diabetes Medicine*. 2013 Jan;30(1):95-9. doi: 10.1111/dme.12004

Results

A total of 938,440 patients had complete data that met our inclusion and exclusion criteria. We identified 3,273 patients with Type 1 diabetes and 45,311 with Type 2 diabetes. 65,852 patients were identified to have one or more infections which included; conjunctivitis (n=39,245), blepharitis (n=14,390), stye/chalazion (n=18,160), endophthalmitis (n=52), orbital cellulitis (n=609), infectious keratitis/keratoconjunctivitis (n=365) and lacrimal gland infections (n=267).

Our models demonstrated an association between diabetes and conjunctivitis (Type 1 OR 1.69; 95% CI 1.51-1.88; p<0.0001 and Type 2 OR 1.17; 1.13-1.20; p<0.0001), Type 1 and blepharitis (OR 1.39; 1.06-1.83; p=0.0184), and Type 2 and endophthalmitis (OR 2.81; 1.40-5.62; p=0.0036) (Table 1a and 1B). There was no association between glycaemic control and risk of any infection.

Conclusion

This is the first large study to examine the association between diabetes and a range of eye infections in a large population. We found that conjunctivitis occurs more frequently in people with diabetes, however, we did not find any substantial increase in risk for other ocular infections. Infection risk was not found to be associated with the degree of glycaemic control.

Hyperglycaemia does not appear to be a major predisposing factor to ocular infections.

Key findings

- Conjunctivitis is the only eye infection consistently more common in diabetes
- Glycaemic control is not an influencing factor in eye infection

Diabetes type	Conjunctivitis		Blepharitis		Stye/Chalazion		Periorbital Cellulitis	
	Odds Ratio (95% CI)	P Value	Odds Ratio (95% CI)	P value	Odds Ratio (95% CI)	P value	Odds Ratio (95% CI)	P value
Type 1	1.61 (1.38-1.88)	p<0.0001	1.39 (1.06-1.83)	p=0.0184	1.13 (0.88-1.45)	p=0.3458	0.59 (0.08-4.19)	p=0.5962
Type 2	1.11 (1.06-1.16)	p<0.0001	1.04 (0.97-1.11)	p=0.2944	1.00 (0.92-1.07)	p=0.9354	0.89 (0.59-1.34)	p=0.5723

Table 1A and 1B: Odds ratios for one or more eye infections (by type) between 1st January 2010 and 31st December 2015.

Models adjusted for age, gender, ethnicity, deprivation quintile, body mass index (BMI), and the presence of connective tissue disorders. No diabetes used as reference in regression models

Diabetes type	Lacrimal Gland Infection		Endophthalmitis		Infectious Keratitis/Keratoconjunctivitis	
	Odds Ratio (95% CI)	P Value	Odds Ratio (95% CI)	P value	Odds Ratio (95% CI)	P value
Type 1	1.45 (0.20-10.40)	p=0.7105	No Cases	No Cases	2.80 (0.89-8.79)	p=0.0770
Type 2	1.12 (0.69-1.84)	p=0.6449	2.81 (1.40-5.62)	p=0.0036	1.11 (0.72-1.72)	p=0.6226



Save this posters details