

# The relationship between diabetes, retinopathy, glycaemic control, acute uveitis and scleritis

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## Aim

Acute uveitis and scleritis are categorised by anatomical site of inflammation; and are frequently idiopathic or linked to systemic disease. We characterised risk of these conditions in relation by type of diabetes and glycaemic control or co-existence of retinopathy.

## Background

Diabetes is the third most common cause of blindness in the western world (1), and the most common cause of blindness in those of working age (2) within that population. Its effects are felt acutely by the society that shoulders this burden, as the patients it afflicts are visually impaired for longer and the socioeconomic effects are greater reaching. Uveitis is not far behind in terms of prevalence of visual impairment, being the fifth most common cause of blindness in industrialised nations (1). Scleritis is an uncommon disease with well-defined incidence rates difficult to determine, however its prevalence is estimated to be 6 cases per 10,000 population. Morbidity arises primarily from associated systemic disease and its aetiology much like acute uveitis is multifactorial.

## Methods

Using the Royal College of General Practitioners Research and Surveillance Centre database, we compared incidence of acute uveitis and scleritis over a six year period. This consisted of a population without diabetes (n=938,440) and with diabetes (n=48,584) we have previously defined (3,4). The impact of glycaemic control on occurrence was assessed in those with diabetes.

Using the area under the curve (5) we stratified patients by HbA1c levels to determine if glycaemic control impacted risk of uveitis or scleritis. HbA1c levels were stratified as good (<52mmol), moderate (52-68mmol), poor (69-100mmol) and very poor (>100 mmol). We utilised logistic regression modelling to identify associations, adjusting for confounders:

**Entire population:** Gender, age, ethnicity, BMI, diabetes type, connective tissue disorder and deprivation quintile.

**Diabetes cohort:** Gender, age, ethnicity, connective tissue disorder, maculopathy, retinopathy stage and deprivation quintile.

## References

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## Results

Our study was able to identify 2,528 episodes of acute uveitis and 1,483 episodes of scleritis in those without diabetes. In the population with diabetes, 253 episodes of acute uveitis and 81 scleritis were found.

We were able to illustrate that acute uveitis was more common in diabetes but there was no association with scleritis and diabetes (Table 1). Additionally we identified a relationship between HbA1c and uveitis but not scleritis (Table 2).

	Uveitis		Scleritis	
	OR (CI)	P- value	OR (CI)	P- value
<b>Age</b>				
15-30	0.53 (0.44-0.63)	p<0.0001*	0.39 (0.48-0.32)	p<0.0001*
30-45 (Ref)	1	-	1	-
45-60	1.65 (1.45-1.88)	p<0.0001*	1.13 (1.31-0.97)	p=0.11
60-75	1.97 (1.72-2.26)	p<0.0001*	0.95 (1.13-0.80)	p=0.58
>75	1.54 (1.29-1.83)	p<0.0001*	0.45 (0.59-0.34)	p<0.0001*
<b>Diabetes Type</b>				
No Diabetes (Ref)	1	-	1	-
Type 1	2.01 (1.18-3.41)	p=0.0099*	1.08 (2.60-0.45)	p=0.87
Type 2	1.23 (1.05-1.44)	p=0.0098*	0.84 (1.10-0.64)	p=0.21
<b>Connective tissue disorder</b>	1.94 (1.47-2.56)	p<0.0001*	3.04 (4.18-2.21)	p<0.0001*

Table 1: Entire population regression model results highlighting Age, Diabetes type and Connective tissue disorder

	Uveitis		Scleritis	
	OR (CI)	P- value	OR (CI)	P- value
<b>HbA1c (mmol/mol)</b>				
Unknown	0.31 (0.14-0.67)	p=0.0029*	0.44 (1.61-0.12)	p=0.21
<53 (ref)	1	-	1	-
53-69	1.20 (0.86-1.68)	p=0.2932	1.07 (1.87-0.61)	p=0.82
69-100	1.57 (1.05-2.33)	p=0.0269*	0.89 (1.89-0.42)	p=0.77
>100	4.72 (2.58-8.65)	p<0.0001*	No cases	No Cases
<b>Retinopathy Stage</b>				
No retinopathy (ref)	1	-	1	-
Non Specific	1.18 (0.78-1.78)	p=0.4357	1.27 (2.89-0.56)	p=0.57
Background	0.89 (0.57-1.41)	p=0.6234	2.03 (4.65-0.89)	p=0.09
Pre-proliferative	1.68 (0.87-3.24)	p=0.1218	1.07 (5.50-0.21)	p=0.93
Proliferative	2.42 (1.25-4.69)	p=0.0089*	1.68 (8.59-0.33)	p=0.53
<b>Maculopathy</b>	1.15 (0.71-1.87)	p=0.5661	1.50 (3.54-0.63)	p=0.36

Table 2: Diabetic population regression model results highlighting HbA1c, Retinopathy and presence of Maculopathy

## Conclusion

Our results identified a distinct relationship between diabetes, age, glycaemic control and retinopathy stage in those suffering from Acute Uveitis. However no such relationship was found in those patients suffering from episodes of Scleritis. This would suggest that Acute Uveitis is more common in patients who suffer from diabetes, particularly type 1 and poor glycaemic control; which is already established to its relationship with progression of retinopathy stage, must play a pivotal role in control and strict monitoring to reduce incidence and potentially devastating complications such as loss of vision.

## Key Findings

- Acute Uveitis is more common in patients with Type 1 Diabetes
- Age influences risk of episode
- Poor glycaemic control detrimentally effects risk of acute uveitis
- A mirrored relationship is seen with stage of retinopathy
- Scleritis is independent from influence of glycaemic control, age or any confounder we studied.



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