What are the visual, service, and cost implications of ‘waiting for documented progression’ in young West of Scotland patients prior to collagen cross linking?

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Introduction

Keratoconus is known to be more aggressive in the paediatric population, with faster progression and often more advanced at first presentation.[1] CXL has been shown to be effective in reducing the progression of CXL and is now widely practiced.[2] Standards for assessing progression are varied and many patients require follow up for several years. This has posed the question are patients attending the early keratoconus clinic being monitored for too long before CXL? Delay in these decisions can have an impact on the patient, with progression leading to increased corneal astigmatism, loss of corneal thickness that may mean CXL is impossible, reduced BCVA and increased scarring. There is also an impact on a department with the cost of unnecessary visits and use of precious clinic space.

Methods

Patients under the age of 20 referred to the Early Keratoconus Clinic between 2015-2019 were considered. This is a tertiary referral centre for the West of Scotland. Their demographic, topographic and intervention data were collected. We also considered the number of appointments patients attended.

Proportion of patients receiving collagen cross-linking

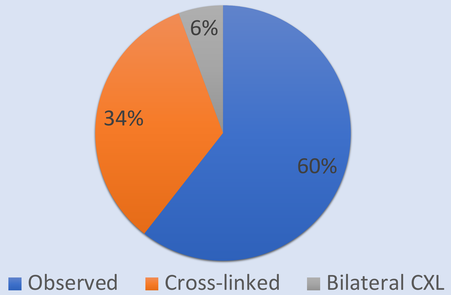


Table 1. Table comparing Pentacam topographic characteristics of eyes from initial assessment to prior to CXL and after CXL.

	Presentation ± SD	Prior to CXL ±SD	P value	Post CXL ± SD	P value
Mean Cylinder	2.80 ±1.85	3.84 ± 2.04	<0.01[a]	3.60 ± 2.19	0.19[a]
Spherical Equivalent	-0.53 ± 1.76	0.18 ± 1.82	0.32[a]	-0.09 ± 1.96	0.39[a]
Anterior K2	49.01 ± 4.04	50.17 ± 4.60	<0.01[a]	51.57 ± 5.15	<0.01[a]
Posterior K2	-7.41 ± 0.77	-7.53 ± 0.80	<0.01[a]	-7.75 ± 0.88	<0.01[a]
Mean CCT (microns)	470.71 ± 42.5	457.64 ± 29.04	<0.01[a]	450.19 ± 32.7	0.03[a]
Kmax	57.64 ± 7.36	58.72 ± 7.13	<0.01[a]	60.31 ± 7.96	<0.01[a]
Median BCVA	6/9	6/12		6/12	
Mean LogMAR	0.16	0.29	<0.01[a]	0.28	0.01[b]
Lines of Snellen VA change		-0.79	0.01[b]	-0.50	0.01[b]

a - paired two-sided t-test; b - one-sample t-test

Results

142 patients were identified. Thus far 56 have gone on to have CXL. The average number of appointments prior to CXL was 3.5. There was an average loss of 20.5 microns of CCT, an increase of 1.56 in refractive cylinder and patients lost on average 0.38 lines of BCVA, from presentation until after CXL . Two patients suffered bacterial keratitis both with significant scarring, BCVA 6/15 and 6/36 respectively. We calculated that if patients had been listed at first review this could have saved the health board £22,440 at a cost of £165 per appointment.

Conclusions

Assessing the progression of keratoconus is controversial, with many different protocols being used. We have shown that in this group the delay to CXL has led to considerable change in corneal thickness, cylinder and loss of BCVA. Collagen cross linking, as with any procedure, is not without risk and some patients will develop complications.

References

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