Laser flare photometry: a useful tool for monitoring children with juvenile idiopathic arthritis-associated uveitis

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Background:
Juvenile idiopathic arthritis (JIA) is the most common associated systemic disorder in children with uveitis. The chronic anterior uveitis is a severe complication that can cause severe or complete loss of vision. In the present study, our purpose was to evaluate laser flare photometry (LFP) values for monitoring patients with JIA-uveitis in a long-term retrospective study.

Patients & Methods:
We analyzed in a retrospective chart review children with JIA-uveitis followed between 1994 and 2015 at La Pitié Salpétrière Hospital (Paris France). We defined two groups of patients according to decrease of the LFP value one month after treatment intensification (LFP decrease >50% in group 1 and <50% in group 2). The primary outcome was defined as prevalence of complications in the two groups of patients at 5 years of follow up and at last visit.

Figure 1 Band keratopathy and cataract complicating a case of JIA-associated uveitis
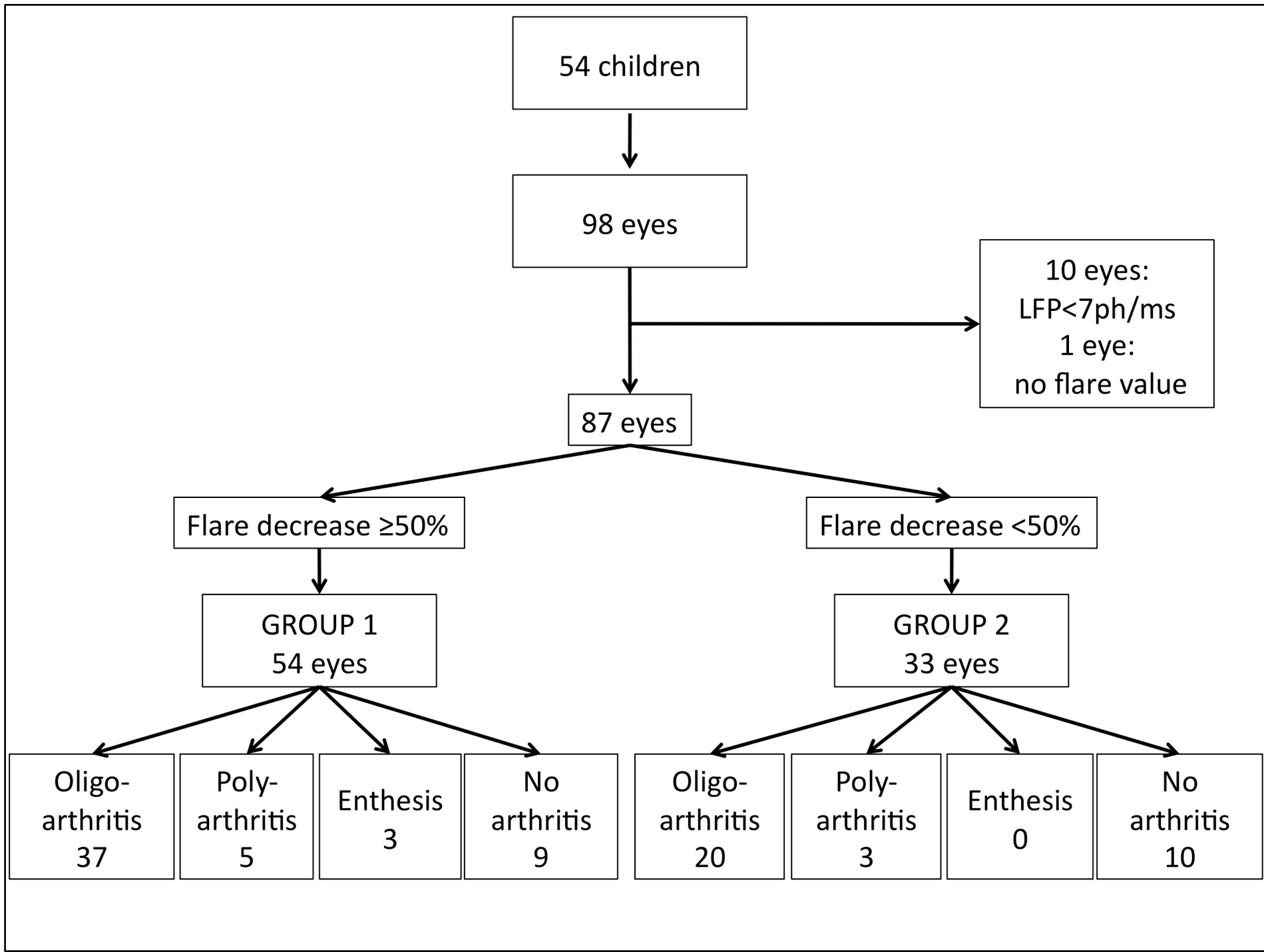
Results:
Fifty-four children (87 eyes) were included in this study (mean follow up 9.9+/-5 years) (*Figure1*). Complications of uveitis were present in 68 eyes (76%) at baseline and in 76 eyes (85%) at last visit (*Table 1 and 2*). LFP values one month after treatment intensification decreased of more than 50% in 59 eyes (66%, group 1) and of less than 50% in 30 eyes (33%, group 2). Group 1 children developed significantly less complications as compared to group 2 children at 5 years and at last visit (*Table 3*). They also kept a better visual acuity (p<0.0001 at both 5years and last visit) and required less systemic immunosuppressive treatments (sixth treatment line at last visit p=0.01) *(Figure 2)*. LFP value was significantly different between the 2 groups at both 5years (p=0.002) and last visit (p=0.0001).
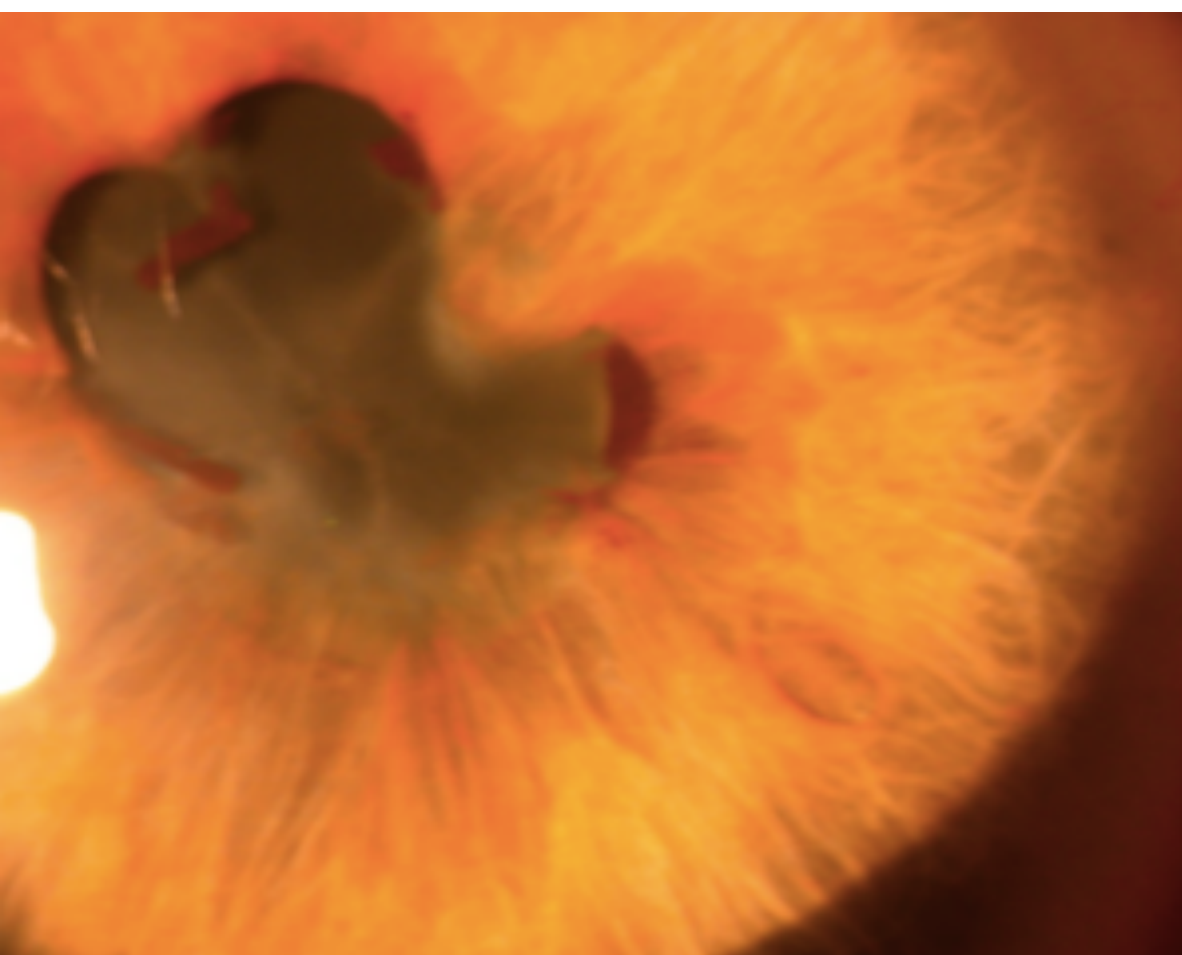
Figure 2 Posterior synechiae in a case of JIA-associated uveitis

Figure 3 Study diagram of the 54 children

	Overall	Group 1	Group 2	p
Number (eyes)	87	54 (62%)	33 (38%)	
Gender				
Female(%)	65 (76%)	39 (72%)	26 (79%)	0.49*
Age at uveitis diagnosis in months (range)	59.1 (14-159)	54.15 (14-159)	67.27 (24-155)	0.09 (t)
Laterality				
Bilateral (%)	75 (86%)	47 (87%)	28 (85%)	0.76**
ANA(%)	69 (79%)	43 (80%)	26 (79%)	0.92*
HLA B-27	16 (18%)	11 (20%)	3 (9%)	0.09*
Mean VA (LogMAR)	0.49	0.34	0.75	0.001 (t)
< 0.3	42 (48%)	32 (60%)	10 (30%)	0.008*
≥ 0.7	26 (30%)	11 (20%)	15 (45%)	0.01*
Anterior chamber cells				
< 1+	20 (23%)	17 (31%)	3 (9%)	0.02*
1+	49 (56%)	33 (61%)	16 (48%)	0.25*
2+	14 (16%)	2 (4%)	12 (36%)	<0.0001*
Vitritis				
< 1+	45 (52%)	34 (63%)	11 (33%)	0.007*
1+	31 (36%)	13 (24%)	18 (55%)	0.004*
2+	9 (10%)	7 (13%)	2 (6%)	0.47**
Mean LFP value (pu/msec)	116.3	104	135.9	0.17(t)
Complications				
None	16 (18%)	14 (26%)	2 (6%)	0.02*
Band keratophaty	40 (46%)	18 (33%)	22 (67%)	0.003*
Posterior synechiae	55 (63%)	29 (54%)	26 (79%)	0.02*
Cataract	45 (52%)	23 (43%)	22 (67%)	0.029*
Glaucoma/Ocular hypertension	20 (23%)	13 (24%)	7 (21%)	0.72*
Macular oedema	23 (26%)	9 (17%)	14 (42%)	0.009*
Papillitis	23 (26%)	8 (15%)	15 (45%)	0.002*
Treatment at baseline				
First line	87 (100%)	54 (100%)	33 (100%)	NA
- local corticotherapy	87 (100%)	54 (100%)	33 (100%)	NA
- oral corticotherapy	48 (55%)	25 (46%)	23 (70%)	0.03*
Second line	29 (33%)	16 (30%)	13 (39%)	0.38
Third line	2 (2%)	1 (2%)	1 (3%)	1**
Mean follow up time (years)	9.9 +/-5	9.48	10.7	0.28 (t)

**Table 1** Demographics and clinical characteristics at baseline

	Baseline	Five years	p	Final visit	p
Number (eyes)	87	87		87	
Visual acuity (LogMar), mean value	0.49	0.40	0.4(t)	0.61	0.3 (t)
< 0.3	42 (48%)	55 (63%)	0.01*	54 (62%)	0.01*
≥ 0.7	26 (30%)	19 (21%)	0.21*	24 (28%)	0.83*
Anterior chamber cells					
< 1+	20 (23%)	64 (74%)	<0.0001*	62 (71%)	<0.0001*
1+	49 (56%)	16 (18%)	<0.0001*	17 (20%)	<0.0001*
Vitritis					
< 1+	45 (52%)	71 (82%)	<0.0001*	66 (76%)	0.0006*
1+	31 (36%)	14 (16%)	0.003*	19 (22%)	0.04*
Mean LFP value					
(pu/msec)	116.3	68.3	0.004 (t)	78.7	0.01 (t)
Complications					
None	16 (18%)	7 (8%)	0.04*	6 (7%)	0.02*
Band keratophaty	40 (46%)	47 (54%)	0.28*	49 (56%)	0.17*
Posterior synechiae	55 (63%)	44 (51%)	0.09*	44 (51%)	0.09*
Cataract	45 (52%)	70 (80%)	<0.0001*	73 (84%)	<0.0001*
Glaucoma/Ocular hypertension	20 (23%)	46 (53%)	<0.0001*	51 (59%)	<0.0001*
Macular edema	23 (26%)	23 (23%)	0.6*	18 (21%)	0.37*
Papillitis	23 (26%)	5 (6%)	0.0002*	8 (9%)	0.003*
Treatment at baseline					
First line	87 (100%)	32 (97%)	0.06**	68 (78%)	<0.0001*
- local corticotherapy	87 (100%)	74 (85%)	0.0002*	54 (62%)	<0.0001*
- oral corticotherapy	48 (55%)	66 (76%)	0.004*	48 (55%)	1*
Second line	29 (33%)	44 (51%)	0.02	21 (24%)	0.13*
Third line	2 (2%)	21 (24%)	<0.0001*	24 (28%)	<0.0001*
More than third line	2 (2%)	21 (24%)	<0.0001*	40 (46%)	<0.0001*

Table 2 Clinical characteristics for overall population at baseline, 5 years and last visit

	Group 1 5years	Group 2 5years	test t 5years (p)	Group 1 end follow-up	Group 2 end follow-up	test end follow-up (p)
Number (eyes)	54	33		54	33	
Mean VA (LogMAR)	0.1	0.9	<0.0001(t)	0.2	1.3	<0.0001(t)
< 0.3	48 (89%)	7 (21%)	<0.0001*	46 (85%)	8 (24%)	<0.0001*
≥ 0.7	1 (2%)	18 (54%)	<0.0001*	4 (7%)	20 (61%)	<0.0001*
Anterior chamber cells						
< 1+	43 (80%)	21 (64%)	0.1*	40 (74%)	22 (67%)	0.46*
1+	10 (19%)	6 (18%)	0.97*	13 (24%)	4 (12%)	0.17*
2+	0	3 (9%)	0.05**	0	5 (15%)	0.006**
Vitritis						
< 1+	47 (87%)	24 (73%)	0.09*	46 (85%)	20 (61%)	0.016*
1+	6 (11%)	8 (24%)	0.1*	7 (13%)	12 (36%)	0.01*
Mean LFP value						
(pu/msec)	42.8	110	0.009 (t)	53.8	119.5	0.0005 (t)
Complications						
None	7 (13%)	0	0.03*	6 (11%)	0	0.047*
Band keratopathy	22 (41%)	25 (76%)	0.001*	24 (44%)	25 (76%)	0.004*
Posterior synechiae	25 (46%)	19 (58%)	0.3*	24 (44%)	20 (61%)	0.14*
Cataract	14 (26%)	10 (30%)	0.65*	10 (19%)	5 (15%)	0.69*
Cataract surgery	24 (44%)	22 (67%)	0.043*	31 (57%)	27 (82%)	0.019*
Glaucoma/Ocular hypertension	26 (48%)	20 (61%)	0.26*	26 (48%)	25 (76%)	0.01*
Trabeculectomy	5 (9%)	11 (33%)	0.005*	10 (19%)	14 (42%)	0.015*
Macular edema	8 (15%)	12 (36%)	0.02*	9 (17%)	9 (27%)	0.24*
Papillitis	2 (4%)	3 (9%)	0.36**	2 (4%)	6 (18%)	0.049**
Treatment						
First line	50 (93%)	32 (97%)	0.65**	38 (70%)	30 (91%)	0.02*
- local corticotherapy	44 (81%)	30 (91%)	0.35**	30 (56%)	24 (73%)	0.11*
- oral corticotherapy	37 (69%)	29 (88%)	0.04*	23 (43%)	25 (76%)	0.002*
2nd line	27 (50%)	17 (52%)	0.89*	12 (22%)	8 (24%)	0.83*
3rd line	9 (17%)	12 (36%)	0.037*	14 (26%)	10 (30%)	0.66*
more than 3rd line	9 (17%)	12 (36%)	0.037*	22 (41%)	21 (64%)	0.038*

Table 3 Clinical characteristics by group at 5 years and end of follow up (*=chi2 test; **=fisher test; t= student test)
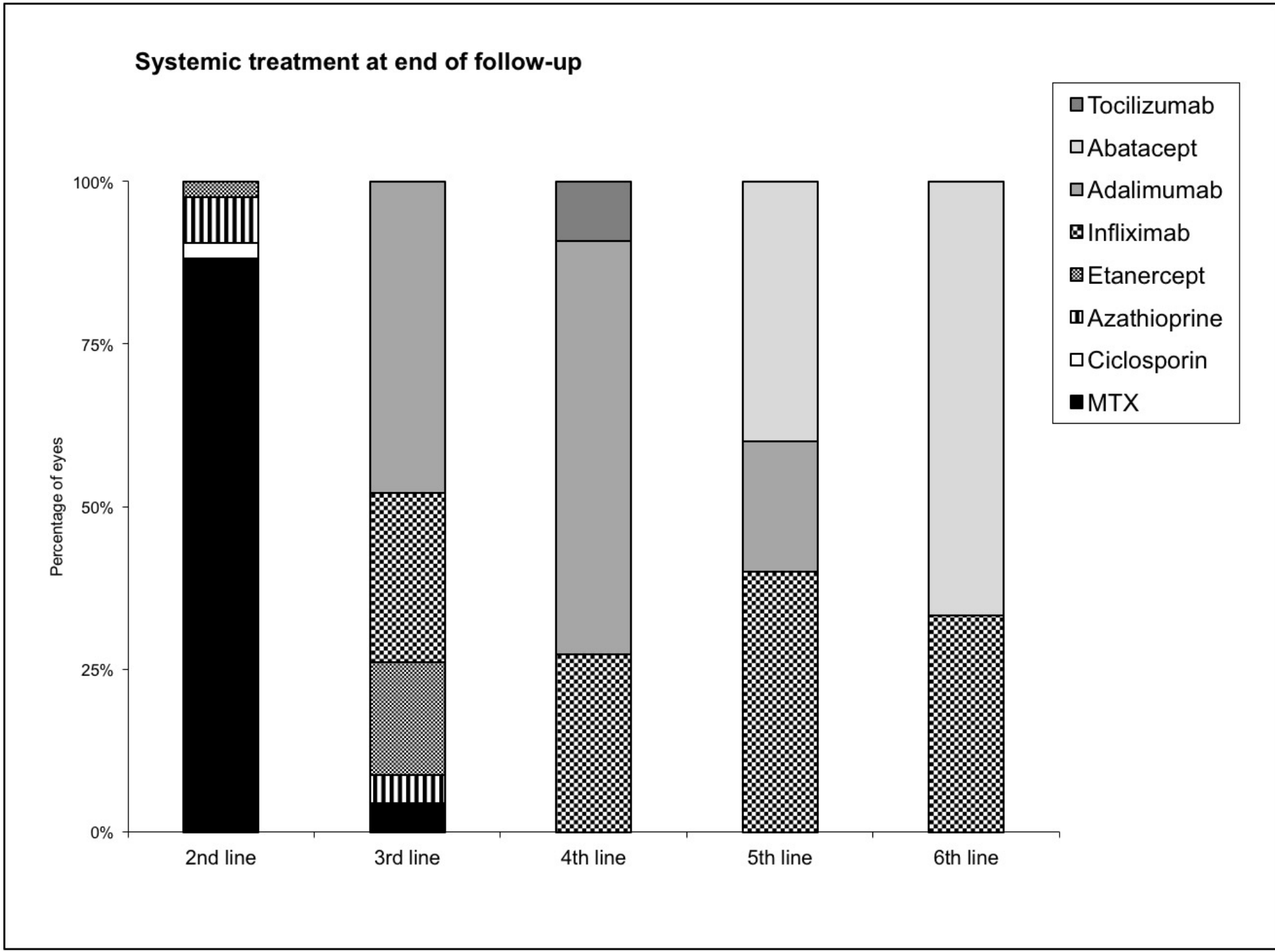
Figure 4 Systemic treatment at end of follow-up

Comments:
Our study is the first long-term study to show that higher LFP values at baseline are associated with higher prevalence of complications at baseline and during follow-up in children with JIA-uveitis. We also highlighted the presence of frequent complications at the end of follow-up, especially glaucoma and cataract related to long-term effects of a local or systemic corticosteroid therapy but also to a chronic breakdown of the blood-aqueous barrier.

Conclusion:
Decrease of LFP values after treatment intensification is a good and early prognosticator of ocular complications and functional prognosis over long-term in children with JIA-uveitis. It should be used to identify children with a pejorative ocular risk. The use of this tool in a challenging disease such as JIA-uveitis may optimize the management of these young patients.

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