

Evaluation of Large Cupping in Children with Anaemia

**Mohamed Yasser Sayed Saif
Beni Suef University**

Co Authors

**Mansour Hassan Ahmed
Ahmed Tamer Sayed Saif
Passant Sayed Saif
Hany El Saftawy
Olaa A. Dabbous
Mohamed Nabil**

Introduction

- In adults, large optic disc cups are often a sign of glaucoma.
- Children, however, show a lower prevalence of glaucoma than adults, but may present with optic disc cupping of non-glaucomatous origin.

1. Yoshida M, Okada E, Mizuki N, et al. (2001) Age-specific prevalence of open-angle glaucoma and its relationship to refraction among more than 60,000 asymptomatic Japanese subjects. *J Clin Epidemiol.*;54:1151–1158.

- Large disc cups in children may be diagnosed as :
 - physiologic large cups
 - may be associated with prematurity and periventricular leukomalacia.

McLoone E, O'Keefe M, Donoghue V, McLoone S, Horgan N, Lanigan B. (2006) RetCam image analysis of optic disc morphology in premature infants and its relation to ischaemic brain injury. *Br J Ophthalmol.*;90:465–471.

Samara wickrama C, Huynh SC, Liew G, Burlutsky G, Mitchell P. (2009) Birth weight and optic nerve head parameters. *Ophthalmology.*;116:1112–1118.

- Children with large optic disc cups often present a clinical dilemma on initial examination, as tests to rule out glaucoma, including intraocular pressure measurement and formal visual field analysis, can be difficult within the paediatric age group.

Blumenthal EZ, Haddad A, Horani A, Anteby I. (2004) The reliability of frequency-doubling perimetry in young children. *Ophthalmology.*;111:435–439.

Varma R, Tielsch JM, Quigley HA, et al. (1994) Race-, age-, gender-, and refractive error-related differences in the normal optic disc. *Arch Ophthalmol.*;112:1068-1076.

- Small optic discs generally have small-to-absent optic cups. Large optic discs generally have large optic cups, but they may have a greater number of nerve fibers than small discs.^{3, 4,5,6}

Blumenthal EZ, Haddad A, Horani A, Anteby I. (2004) The reliability of frequency-doubling perimetry in young children. *Ophthalmology*;111:435-439.

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- Asymmetry of the cup-to-disc ratio greater than 0.2 or notching or focal or diffuse thinning of the rim of the optic nerve is characteristic of glaucomatous changes.

- The ISNT rule is a useful strategy in detecting glaucomatous optic nerves.

Harizman N, Oliviera C, Chiang A, et al. (2006) The ISNT rule and differentiation of normal from glaucomatous eyes. *Arch Ophthalmol.*;124:1579-1583

- Pathologic cupping of the optic nerve is most commonly associated with glaucomatous optic neuropathy.¹

Non glaucomatous causes of cupping
as:

- ischemic optic neuropathies
- optic neuritis
- hereditary optic atrophies (older age).

But is anaemia in children less
dangerous than glaucoma?

Aim of the work

- The purpose of this study is to evaluate the effect of anemia in eyes with non-glaucomatous cupping in children.

Subject and Method

- This is a prospective analysis in :
 - Beni Suef University hospital,
 - Fayoum university Hospital,
 - Research institute of Ophthalmology,
 - National Institute of Laser Enhanced Sciences,
 - Misr University hospital

Inclusion criteria

- Age : 6- 18 years
- C/D ratio > 0.4

Exclusion criteria were as follows:

- Cup disc ratio less than 0.4
- Mixed or unclear diagnosis,
- spherical equivalent $> \pm 5$ diopters,
- Retinal pathology.

All patients were subjected to

- Full ophthalmological examination
- visual field testing
- OCT
- CBC
- Stool analysis

Results

- 3361 patient Screened
- 236 patients :cupping of > 0.4

Table 1 summarizes the details of demographic data of the patients.

	female	male	Total
Count	137	99	236
percentage	58.05%	41.95%	100 %
Average age	11.36	11.64	11.48
StdDev	3.20	3.25	3.22
Max	18	18	18
Min	6	6	6
Var	10.26	10.54	10.35

Table 3 Shows the statistical analysis of IOP for eyes included in this study.

IOP	
Average	11.752
StdDev	1.539
Max	15
Min	9
Var	2.369

Values	C/D ratio			Difference between 2 eyes		
	female	male	C/D ratio	female	male	C/D Diff
Average	0.4971	0.5015	0.4989	0.0277	0.0354	0.0309
StdDev	0.0957	0.0904	0.0934	0.0481	0.0540	0.0507
Max	0.8	0.8	0.8	0.2	0.2	0.2
Min	0.4	0.4	0.4	0.0	0.0	0.0
Var	0.0091	0.0082	0.0087	0.0023	0.0029	0.0026
P-Value						0.0002

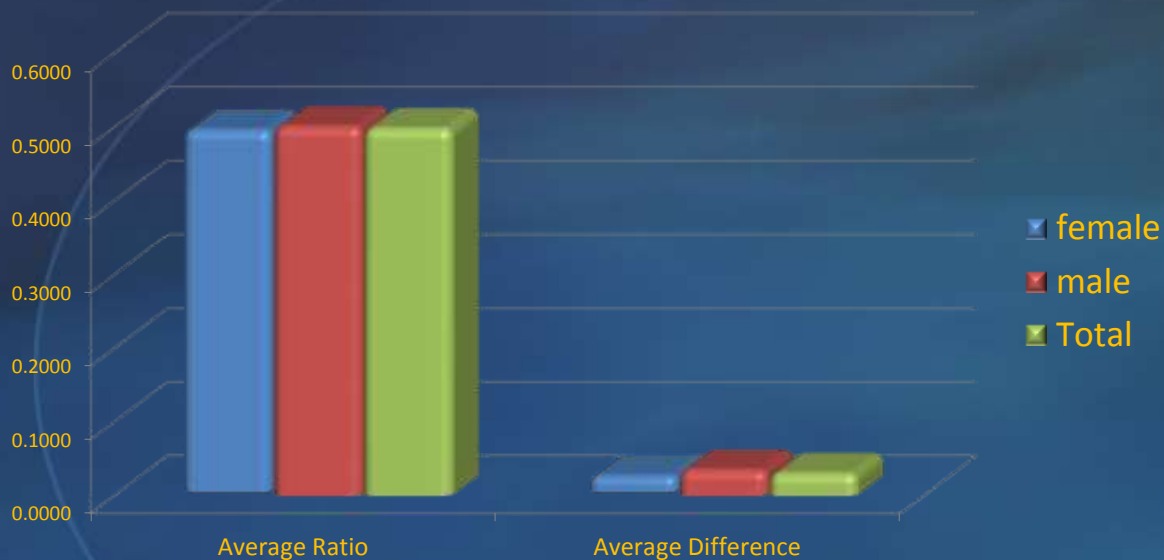


Figure1 : the mean C/D ratio and mean C/D difference between both eyes in the study group with the sex difference

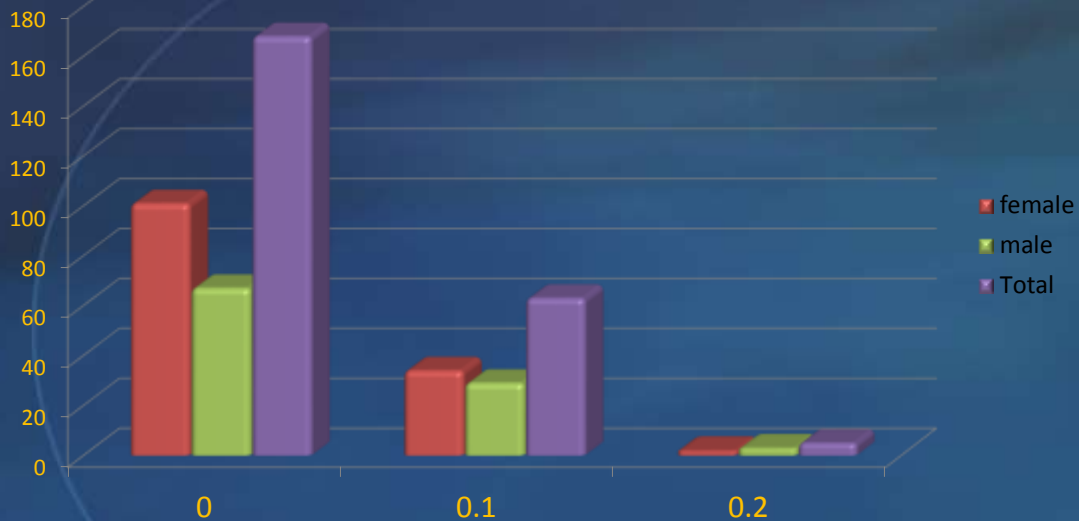


Figure 2: the C/D difference between both eyes in the study group with the sex difference

HB	female	male	Total
Average	10.79	11.04	10.89
StdDev	0.89	1.09	0.98
Max	12.30	14.00	14.00
Min	7.80	7.20	7.20
Var	0.79	1.18	0.96

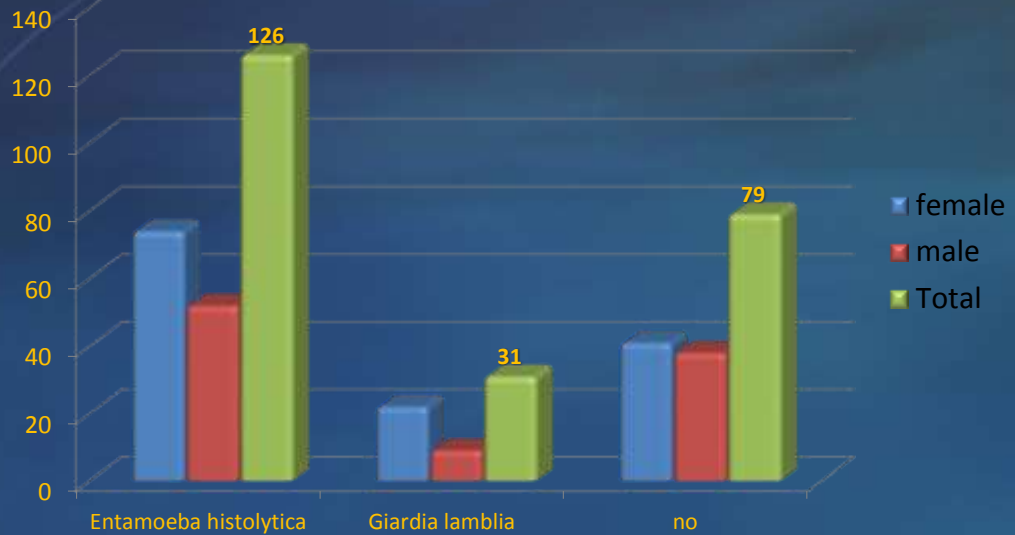
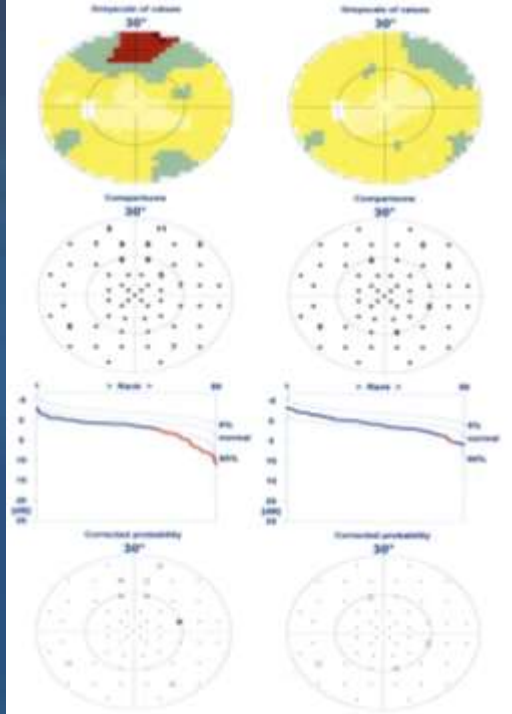
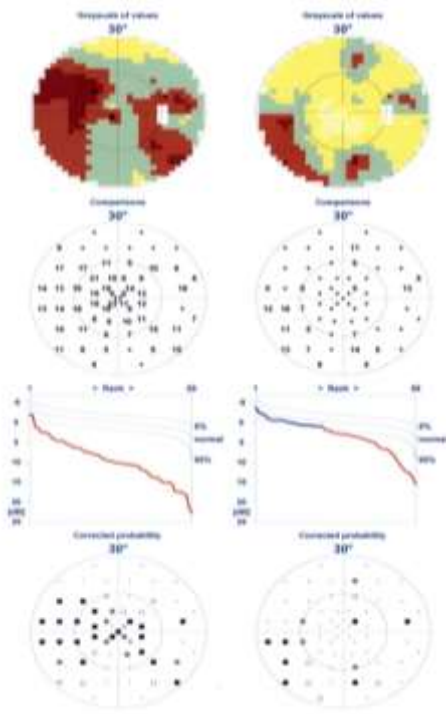


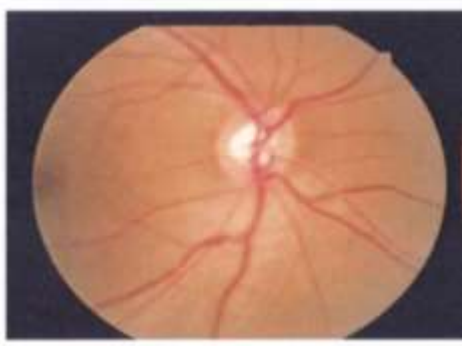
Figure 3: statistical analysis for stool examination as regards the parasites

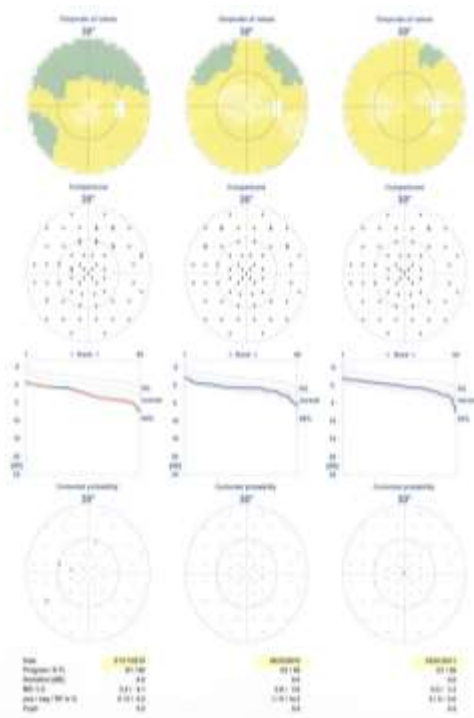
- The significant visual field findings was present in 63 (26.69%) patients
- (13.98% females, 12.71% males)

Significant VF	female	male	Total
no	104	69	173
present	33	30	63
Grand Total	137	99	236

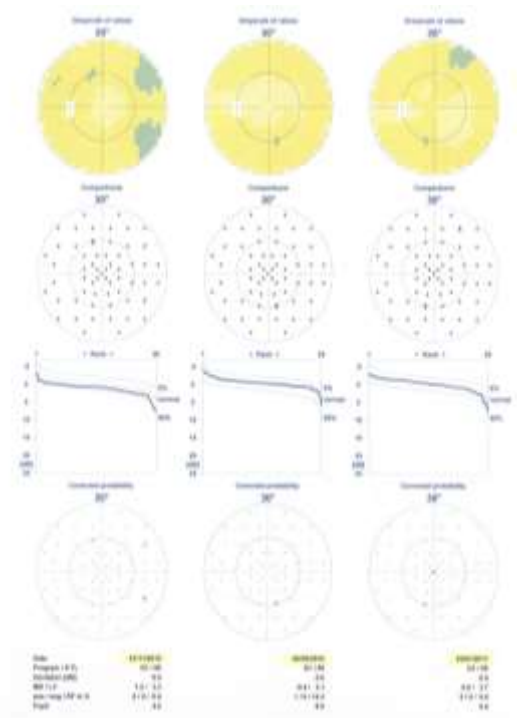


A female patient





A female patient



Conclusion:

- In conclusion to our work we found that functional optic nerve damage is a possibility in children with anemia, cupping in normal IOP

- There is very high incidence of parasitic infestation in those children that warrants for state intervention to deal with this problem.
- A larger scanning by the ministry of health may be needed to verify these results.

Take Home Message

- Optic disc cupping in children should be taken seriously
- Do CBC and stool analysis for children complaining of headache
- Pediatricians consider Ent Hist and Giardia as normally present please instruct to treat
- Treat anemia before visual field test