



## SCIENTIFIC LETTER

## Assessment of non-expert ophthalmologists in the analysis of retinopathy of prematurity<sup>☆</sup>



### Evaluación de oftalmólogos no expertos en el análisis de la retinopatía del prematuro

Dear Editor:

Retinopathy of prematurity (ROP) is currently one of the leading causes of potentially preventable blindness in children. While not every infant that develops ROP of any degree experiences severe disease or requires treatment, early detection is critical to achieve the best possible vision outcomes.<sup>1</sup> However, every day, neonatology and technological advances improve the care and survival of increasingly premature infants, thereby increasing the number of newborn infants at risk of developing ROP.<sup>2</sup>

A concern in Europe when it comes to ROP screening, and in Spain in particular, is that not every hospital that offers neonatal care has ophthalmologists on staff that specialise in the care of premature infants. Moral Pumarega et al. analysed ROP screening in neonatal units in a total of 99 public and private hospitals that managed neonates with birth weights under 1500 g. They found that only 39% of surveyed hospitals had specialised paediatric ophthalmologists, while in all other centres evaluations may be performed by any of the ophthalmologists on staff.<sup>3</sup>

But what happens when a seasoned ophthalmologist that is not an expert in ROP performs the screening? The examination of the peripheral retina requires specific training and experience, and the procedure has systemic effects on the premature infant.<sup>4,5</sup> We conducted a pilot study to assess the role of the different specialities in clinical ophthalmology in the detection of ROP and referral to a specialist, for which clinicians were asked to analyse retinal images with and without signs of ROP. First, we ought to highlight that intraobserver agreement was excellent in all clinicians, with values ranging from 82% to 98% (Table 1).

The specificity of screening was high for all clinicians (83%–100%), but the sensitivity varied substantially between observers (49%–88%), as only the 2 general ophthalmologists and the expert in ROP exhibited a high sensitivity in

the detection of ROP (Table 2). When it came to the referral to a specialist, the results differed substantially between observers and in relation to the results obtained in the other variable. Only the ophthalmologist that was an expert in ROP had acceptable results in both variables (diagnosis of ROP and referral to a specialist). Analysing each clinician individually, we found that the results of a renowned retina specialist of the Community of Madrid (Dr. 2) were poorer than even those of a beginner retina specialist (Dr. 6).

The definition of retinography equipment is likely to increase over time, which will probably result in an improvement in the treatment of ROP through telemedicine. Recent studies have analysed artificial intelligence as a diagnostic method, an additional step in the objective assessment of retinopathy that does not require an expert in ROP.<sup>6</sup> Still, further research is required in this emerging field. Timing is crucial in ROP screening, and telemedicine helps overcome many of the limitations of the conventional approach to diagnosis. This approach could allow excellence in care in the assessment and management of infants with ROP.

In this day and age, allowing the occurrence of totally preventable cases of blindness is completely unacceptable. First, on account of affected children and their families, and, if this were not enough reason, due to the economic cost for the state of a visually impaired individual. On the other hand, we need to consider the legal repercussions that may be faced by ophthalmologists. Thus, we should prioritise training of ROP specialists able to provide rigorous care and follow-up.

In conclusion, our pilot study evinced substantial variability in the assessment of ROP by experienced ophthalmologists, independently of the years of experience or the subspecialty of ophthalmology, and that the diagnosis and treatment of ROP require specific training. Retinopathy of prematurity and its sequelae can cause problems

**Table 1** Intraobserver agreement for the ROP variable in the 17 sets of images repeated at random.

Speciality	Intraobserver agreement (%)
Dr. 1 Anterior segment	90
Dr. 2 Retina	91
Dr. 3 Anterior segment	90
Dr. 4 Anterior segment	98
Dr. 5 General	82
Dr. 6 Retina	95
Dr. 7 Retina specialist expert in ROP	98
Dr. 8 General	98

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**Table 2** Sensitivity, specificity and kappa statistic for the diagnosis of ROP and referral to a specialist (ROP type 1 + 2) by the 8 participating ophthalmologists compared to the reference diagnosis performed by a paediatric ophthalmologist expert in ROP.

ROP	Speciality	Sensitivity, % (95% CI)	Specificity, % (95% CI)	Kappa (standard error)
Dr. 1	Anterior segment	49 (7)	100 (0)	0.3655 (0.0786)
Dr. 2	Retina	67 (7)	100 (0)	0.5531 (0.0878)
Dr. 3	Anterior segment	70 (7)	100 (0)	0.5808 (0.0903)
Dr. 4	Anterior segment	74 (6)	100 (0)	0.6243 (0.0871)
Dr. 5	General	86 (5)	83 (11)	0.6216 (0.1197)
Dr. 6	Retina	73 (6)	100 (0)	0.6210 (0.0876)
Dr. 7	Retina specialist expert in ROP	88 (5)	95 (5)	0.7771 (0.0788)
Dr. 8	General	82 (6)	100 (0)	0.7273 (0.0816)
Referral	Speciality	Sensitivity. % (95% CI)	Specificity. % (95% CI)	Kappa (standard error)
Dr. 1	Anterior segment	8 (4)	100 (0)	0.0638 (0.0368)
Dr. 2	Retina	2 (2)	100 (0)	0.0203 (0.0203)
Dr. 3	Anterior segment	87 (6)	81 (8)	0.6808 (0.0975)
Dr. 4	Anterior segment	12 (5)	100 (0)	0.1032 (0.0461)
Dr. 5	General	23 (8)	43 (19)	-0.1657 (0.1147)
Dr. 6	Retina	30 (7)	100 (0)	0.2609 (0.0722)
Dr. 7	Retina specialist expert in ROP	85 (6)	59 (9)	0.4536 (0.1080)
Dr. 8	General	37 (8)	97 (3)	0.2942 (0.0813)

throughout the lifespan, so correct assessment is crucial to reduce the potentially devastating impact of this disease, which is surging in countries with different incomes and levels of development. Therefore, until effective artificial intelligence models are developed, we need to ensure the availability of ophthalmologists specialised in ROP who can make an accurate diagnosis through telemedicine.

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