



Guest Editorial

Cataract surgery in the Amazon: Overcoming the challenges

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Reaching remote populations and promoting high-complexity ophthalmic care has always been a challenge in the history of humanity.

Like any region, the Amazon and its inhabitants have their characteristics. The State of Amazonas, with its continental dimension, demographic index of 2.23 inhab/km^[1,2] and predominance of river transport between its cities, makes access to healthcare limited, further increasing its isolation, which is responsible for the difference in quantity and quality of ophthalmological services between its capital the other, more remote parts of the state. This remote but large part of the state is composed of 61 municipalities, but has only 2% of the state's ophthalmic doctors,^[2] creating the ideal scenario for the evolution of eye diseases that would otherwise be reversible, such as cataracts, glaucoma, pterygium and diseases of the retina.

In 2020, an estimated 15.2 million people over the age of 50 were blind and more than 78.8 million had moderate-to-severe visual impairment due to cataract, according to data from the Global Burden of Disease Study, GBD.^[3]

In 2013, in a partnership between the Federal Universities of Amazonas (UFAM) and São Paulo (UNIFESP), the Brazilian Amazon Region Eye Survey was started, BARES, an epidemiological study, aimed at evaluating the main cause of low visual acuity and blindness in older adults over 45 years of age in the Amazonian population.^[4]

This project arose from the need for more information about eye diseases in our region, since the existing data are the result of few studies of the southeast of Brazil^[5,6] and that did not correspond to the Amazonian reality, since the dimensions of the country make it impossible to carry out a national population-based survey about blindness.

According to BARES,^[4] the prevalence of blindness was approximately 1.5–3.5 times higher than in the previous surveys carried out in Brazil, with cataract being responsible

for 62.4% of cases, followed by retinal diseases, 15.3% (diabetic retinopathy, macular degeneration, retinal detachment and others) glaucoma, 11.8%, absence/disorganisation of the eye 10.6%, corneal opacity, 8.2% and pterygium 3.5%, the latter being an important cause of unilateral blindness in 6.8% of cases, suggesting a strong relationship of ultraviolet exposure on this population, like Paula *et al.*, in 2006, reported an increase of pterygium prevalence in different Indian tribes in the Amazon.^[7] Uncorrected refraction errors are the leading cause of eyes with mild and moderate/severe visual impairment.

In this context, humanitarian ophthalmology (HO) was born, a non-profit organisation supported by the will of ophthalmologist friends from various parts of Brazil, universities, industries of the ophthalmology, pharmaceutical and optical sectors, in addition to the Brazilian Navy, which is responsible for guiding us along the extensive rivers of the Amazon, and helping us to overcome the first challenge, the geographic distance [Figure 1].

Social projects such as HO are driven by challenges, both in the primary eye health service access and in donating reading magnifying glasses [Figure 2], as well as in providing highly complex assistance using techniques and technologies that can benefit those most in need [Figure 3].

HO's reach surpassed the limits of welfarism and also embarked on in ophthalmic education, along with residency and fellowship programmes, helping in the theoretical improvement and practical training of resolute surgical techniques such as Manual Small Incision Cataract Surgery (MSICS), which is becoming increasingly popular in our region due to its safety, low cost and excellent reproducibility, especially in more advanced cataracts.

On our latest trip, in May 2022, we travelled through three cities along the Negro River, reaching the municipality of Santa Isabel do Rio Negro located 781 km away from

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Figure 1: Brazilian Navy ship guiding us through the Black River.



Figure 2: Donation of reading glasses on the navy ship.



Figure 3: Operating room.

the capital (approximately 36 h by boat) with a prevalence of Yanomami indigenous population, with unique ophthalmological characteristics, distinct from other regions of the country, with eyes of small axial length, a narrow anterior chamber and very large and hard cataracts.

During the 10 days of the project, 200 cataract surgeries were performed, with more than 90% by phacoemulsification with foldable lens implant, Type 7B – Alcon (sponsor of

the year 2022), and the rest, more serious cases associated with low endothelial count, small eyes with shallow anterior chamber, the chosen technique was MSICS, for its efficiency, safety and low complication rate. This technique should be widely disseminated not only as an option in the surgical arsenal but also as a technique of first choice in social (charitable) surgeries, thus reducing the costs without affecting the quality of the surgery and the patient's visual outcome.^[8,9]

The isolation of these regions, as well as the absence of ophthalmologists, prompted the Brazilian Council of Ophthalmology, CBO, to encourage the creation of more medical residency programmes in Brazil in 2015.^[10]

Today, the capital of Amazonas has three specialisation services in ophthalmology, training approximately 12 new specialist doctors per year. That tends to improve the level of eye care in the state, but the lack of government incentives discourages the relocation of ophthalmologists to remote areas. This brings us back to the quote, still in the 80s, by Prof. Jacob Cohen, in the publication *Revista Brasileira de Oftalmologia*, in which he concluded that the main cause of blindness in the remote areas of the Amazon is the isolation of the riverside populations and their abandonment by the public authorities.^[11]

Over the past 10 years, HO has grown exponentially, expanding its existentialist reach, encouraging research and supporting the training of new specialists. With that, it drew the attention of the international medical community and, in 2019, won the António Champalimaud Vision Award, a global initiative for the prevention of blindness,^[12] strengthening and increasing even more our will to explore the Amazon and overcome the challenge of preventing and treating the eye diseases that ravage this population that already suffers so much from its geographical isolation.

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