

SOFTWARE FOR THE ANALYSIS, MANAGEMENT AND IMPROVEMENT OF THE QUALITY OF CARE OF RETINA-MACULA DISEASES

DESCRIPTION OF THE TECHNOLOGY

The macula is the central area of the retina, responsible for the best visual acuity and direct central vision, necessary for activities of daily living - such as reading, driving or identifying people.

Macular diseases are responsible for more than 50% of vision loss in the developed world. Numerous pathologies can affect it, mainly age-related macular degeneration (AMD), diabetic macular edema (DME) and venous obstructions or retinal thrombosis, uveitis (intraocular inflammation due to rheumatologic or autoimmune diseases), along with other less prevalent pathologies, causing a progressive and irreversible deterioration of vision, leading in the most severe cases to blindness.

AMD is the most common cause of legal blindness in people over 50 years of age in Western countries. Its prevalence increases with aging, from 6.4% in people between 60-75 years of age, to 15-20% in people over 75 years of age, some 700,000 in our country, a figure that the World Health Organization (WHO) expects to triple in the coming decades.

DME and diabetic retinopathy are complications associated with diabetes and are the leading cause of vision loss in diabetic patients, 20 times higher than in the general population, and the leading cause of low vision in young people in developed countries. The prevalence of DME is 11% in diabetic patients, about 400,000 people in our country.

The treatment of these pathologies and others that affect the macula with less prevalence, consists of intraocular injections of vascular endothelial growth factor inhibitors (Anti-VEGF) or corticosteroids.

These drugs have a high economic and health impact due to their cost and chronicity, since multiple cycles of treatment must be performed, usually monthly, and extended over time in order to maintain vision.

Researchers from the UPV and FISABIO have developed a multicenter software that integrates Explainable Artificial Intelligence (EIA) and Data Science technologies to improve the capture and analysis of information from patients with macular diseases, which allows the integration of all clinical variables of patients related to the pathologies described above, and provides unified information on the evolution of patients, individually and collectively, classified by pathology or medication. It allows us to draw conclusions about our clinical practice, optimize processes and support medical decision-making.

This will make it possible to offer better quality care and greater rationality in pharmaceutical spending, improving the management of drugs with a high economic impact used in Ophthalmology Services (OS), which will have a significant economic impact as chronic pathologies are becoming increasingly prevalent.

With this tool, epidemiological studies can be carried out to improve diagnosis and care (by creating patient profiles). Likewise, consultations will be optimized in terms of waiting times, number of visits and treatment indications. Cost-benefit will be improved and it will be possible to follow up the patient according to the therapeutic plan used.

MARKET APPLICATION SECTORS

Software companies specialized in clinical management.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

- It optimizes healthcare resources and hospital spending. Currently, the annual pharmaceutical expenditure in the Valencian Community on macular disease treatment exceeds 10 million euros.
- It allows the design of the best strategies or therapeutic plans for patients.
- It allows, thanks to the information provided, to open new fields of research in the pathology.

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CURRENT STATE OF DEVELOPMENT

The first version of the software is currently available and is at the beginning of the validation phase in a relevant environment (TRL4).

INTELLECTUAL PROPERTY RIGHTS

The software has FISABIO registration E_27_2021 dated 03/17/2021.

COLLABORATION SOUGHT

Companies interested in signing a licensing agreement to commercialize the technology.

RELATED IMAGES



Figure 1. Representation of the evolution and therapeutic plan. The program presents us with a large amount of information in a screenshot. For example, we observe the visual evolution of a patient over time, medication, number of relapses and how long they occur, response to medication, number of injections, expense, right eye, left eye or both, etc.

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