4P's strategies in diabetes

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Efficient management of chronic diseases is often summarized by the concept of 4P medicine: Predictive, Preventive, Personalized and Participative. Applied to diabetes and related metabolic disorders, this approach rests on a simple but demanding principle: to prevent or delay largely non-curable diseases driven by age, lifestyle and environment, it is necessary to anticipate risk. This includes identifying individuals with a high intrinsic susceptibility, deleterious lifestyles or adverse environmental exposures, as well as those already presenting sub-clinical alterations preceding overt disease and co-morbidities.

The objectives span the full prevention spectrum: primary prevention in the general population, secondary prevention in high-risk individuals (for instance those with a family history of diabetes), tertiary prevention aimed at limiting complications in patients, and even quaternary prevention, with the goal of delaying disability and death. Often referred to as precision medicine, this strategy is even more accurately described as 5P medicine (adding Population studies), as it success critically depends on well-designed cohorts, longitudinal follow-up and advanced data analyses.

Such a paradigm can only be effective when supported by major therapeutic breakthroughs. While this remains a challenge in neurodegenerative diseases such as AD, it is now becoming a reality in cancer and diabetes and its cardiometabolic comorbidities. The emergence of a new generation of highly effective treatments targeting diabetes, obesity, dyslipidemia and hypertension — together with their renal, cardiovascular and cerebrovascular complications — offers an unprecedented opportunity to transform patient outcomes (Incretin receptors agonists, SGLT2 inhibitors, new medications against dyslipidemia including high lp(a) etc.... When administered at the right time to the right individuals, these therapies have the potential to dramatically reduce premature disability and mortality associated with diabetes (up to 14 years of life expectancy reduction in patients with diabetes).

Growing evidence indicates that the integration of genetics, epigenetics, metabolomics and proteomics, combined with a holistic assessment of metabolic risk and early disturbances, can identify individuals at risk and guide optimal, individualized therapeutic strategies. It is particularly already true for genomic medicine where evidence shows that rare and frequent DNA variation as well as epigenetic marks can help to adapt the treatments to individual risks and needs. Personalized diabetes care is therefore no longer a theoretical concept, but a realistic and actionable roadmap for improving long-term outcomes in metabolic disease