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Liver diseases are a testbed for digital medicine

The first Italian conference on AI and hepatology will take place in October in Rome, highlighting the challenges of applying algorithms to clinical practice.

Clara Balsano & Bruno Siciliano



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A microscopic image of liver tissue affected by steatosis, common condition caused by the accumulation of fat in the liver. Credit: OGphoto/iStock/Getty Images Plus.

Liver diseases are an excellent example of the many obstacles still to be overcome for digitalization of real-world medicine, as was recently shown by an outstanding article by David Nam and others on the use of artificial intelligence for the study of the liver¹. The authors present an interesting roadmap for the further development of novel biomarkers in hepatology and highlight and outline critical obstacles which need to be overcome to integrate AI systems in clinical practice.

The Italian government launched in November 2021 its [Strategic Program on Artificial Intelligence for 2022–2024](#), that includes several aspects related to health and medicine. To connect to that strategy, and to disseminate the culture of AI applied to healthcare, the Italian Association for the Study of Liver (AISF) is preparing the first Italian congress for Application of AI to hepatology. On 13 and 14 October, a [Monothematic AISF conference on “Artificial Intelligence and Liver Diseases”](#) will take place at the Auditorium Antonianum in Rome.

It is well known that machine learning (ML) and deep learning (DL) can be applied to achieve automated data interpretation, but the more exciting application is their ability to extract features or parameters from complex or big data that would have escaped the human eye¹. However, these advanced technologies in hepatology are far behind other fields of medicine (e.g., dermatology, oncology, cardiology etc.).

Hepatology is the clinical study of liver diseases, and a prime example of the complexity of modern medicine. Treating liver diseases demands that physicians rely on a vast array of diagnostic data modalities (medical history, clinical data, laboratory tests, imaging, pathology slides), on which the clinical management and outcomes depend². In addition, the liver is a complex and unique organ able to regenerate, replacing damaged tissue with new cells³. The liver is also a vital organ which carries out more than 500 functions, the most important ones being regulation of metabolism, neutralizing toxins and fighting infections. AI clearly offers the possibility to innovate and improve management of hepatologic patients, but a multiscale synergistic approach with tools for the analysis of complex data is needed. Accordingly, despite AI's promise for translation in liver imaging (histological and radiological), Nam and his co-authors have highlighted a lot of anomalies in methodology of acquisition of data and liver imaging instruments (CT, MR and US), which prevent algorithms from being translated in clinical decision making^{4,5,6}.

The [GenIA project](#), an innovative initiative in this field, involves the Italian Liver Foundation, the Prodigys Group and Insiel S.p.A, located in the Basovizza Area Science Park in Italy. This project has created a digital platform containing clinical and laboratory data of patients suffering from one of the most widespread liver diseases: hepatic steatosis, characterized by the accumulation of fat in the liver. This pathological condition caused by a high-calorie diet and sedentary lifestyle, and is considered one of the biggest health issues of this century. Although the highest incidence was reported between 40 and 60 years of age, the condition is increasingly presenting in children and young people. GenIA has started a pilot study which aims to prevent the further onset of this pathology thanks to ML/DL algorithms able to forecast the progression of liver steatosis.

In addition to the October conference, several other events have been planned by AISF, and by the European Association for the Study of the Liver (EASL) and the American Association for the Study of Liver Diseases (AASLD) to create, through educational events, new skills aimed at applying algorithms in the clinical practice of hepatologists.

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