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Precision care solutions for multiple sclerosis

Octave has developed a first-in-class, fully integrated comprehensive Precision Care Solution for the personalized treatment of multiple sclerosis and other neurodegenerative diseases.

Optimal management of multiple sclerosis (MS), a chronic progressive disease of the central nervous system (CNS), is lacking. The disease has a complex and varied pathogenesis and is driven by immune modulation, inflammation, and neurodegeneration including demyelination and axonal damage. MS is associated with symptoms and comorbidities including mobility, gait, spasticity, dexterity and cognition.

Unfortunately, the tools available to assess patients are subjective, qualitative and inadequate to meet the complexities of managing a heterogeneous patient population in an evolving therapeutic landscape. Hence, MS patients are often underserved, with outcomes that may be debilitating, disabling or devastating. Lifetime costs per patient are estimated to be $3–4.5 million and up to 50% of patients are out of the workforce within 15 years following diagnosis. The challenges impact the entire MS ecosystem including physicians, payers, and pharmaceutical companies developing therapies. Recognizing this extraordinary area of unmet need and the opportunity to address it, Octave, based at Menlo Park, California, has developed a first-in-class, fully integrated MS Precision Care Solution.

Comprehensive care solution

Octave's quantitative, objective measurement system combines multiple layers of insight to provide a comprehensive and longitudinal perspective of disease progression that can be used to expand clinical insights into neurodegenerative disease, beginning with MS (Fig. 1). "To dramatically improve outcomes we need to improve management. To improve management, we first need to improve measurement," explained William Hagstrom, Founder and Chief Executive Officer of Octave. "Our multimodality approach involves understanding disease biology, better characterization of the CNS, and continuous monitoring of patient symptoms."

i. Biology: Biomarker blood test. The first layer measures the patient's disease biology to reveal underlying activated pathways and mechanisms. This includes the quantitative analysis of serum proteins to create unique MS signatures. Octave's team has developed a test that measures 18 biomarkers corresponding to immunomodulation, neuroinflammation, myelin biology, and neuroaxonal integrity, and includes a quantitative score on a scale of 1–10. The Disease Activity test has been clinically validated and includes the evaluation of more than 1,200 biomarkers in over 2,000 patient samples.

ii. Imaging: Enhanced magnetic resonance imaging (MRI) analytics. The second layer involves improved MRI readings and interpretation to reveal more insights of the CNS with a focus on brain and spine. Octave enhances and optimizes
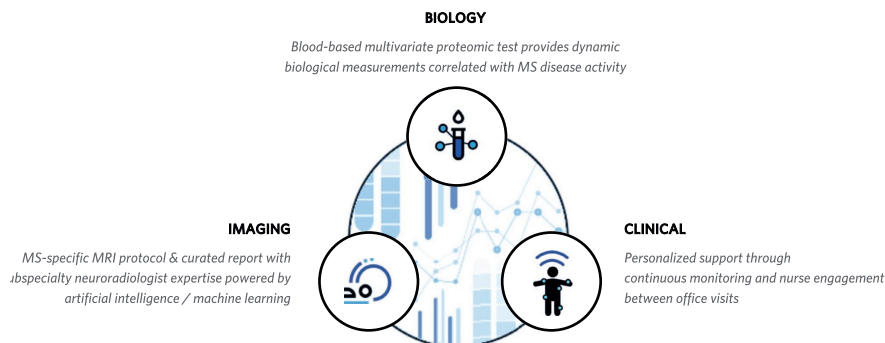

Fig. 1 | Octave's comprehensive MS Precision Care Solution. The Octave platform combines data from three layers, providing 360-degree views of individual patients and populations. MS, multiple sclerosis.

images, adding quantification from artificial intelligence (AI) of MS-specific features (such as brain volume, atrophy and lesions), serial trends (such as change in lesion, burden and atrophy rates over time) and contextualization with neuroradiologist expertise through reports that have been personalized to the patient's clinical presentation to improve information quality. "Our curated reports are easy to interpret and pilot studies demonstrate a 44–52% improvement in identifying clinically significant features," said Hagstrom.

iii. Clinical: Continuous monitoring. The third layer features real-time tracking of patient clinical manifestation to help identify temporal trends in symptoms and major co-morbidities between office visits as well as tracking drug adherence, tolerability, and identifying early signs of relapse. In addition to a mobile tool, Octave plans to capture high-resolution data using customized/optimized off-the-shelf sensors and wearables to further identify changes in disease status and alert care teams. These capabilities, coupled with engagement with MS-certified nurses, provide for an optimized tech–human solution to provide significant clinical insights and impact.

Data from all three layers—the blood test, enhanced MRIs, and continuous monitoring—are then integrated on the Octave Solution to provide a 360-degree, dynamic view of patients and trajectory. This includes structured analytical data models and dashboard capabilities. "Our three-layer, multimodal model of biological, radiographic and clinical data combined with sophisticated analytics, contextualization, and AI allows for individual patient and population views to facilitate better stratification and interventional strategies," said Hagstrom.

Precision care solutions for all

Octave's comprehensive Solution is designed to address the MS ecosystem providing physicians,

patients, insurers and pharmaceutical companies with objective metrics for improved management decisions. "High-quality, high-resolution information that is actionable makes for improved disease assessments helping neurologists better manage patient populations, while improving care and outcomes for individual patients, and reducing costs," said Hagstrom. "Our precision tools and services can also help pharma companies to better understand biological, radiographic and clinical phenotypes as well as stratify patient populations, characterize therapies and associated mechanisms, and optimize their pipeline drug candidates."

Partnering

The MS Precision Care Solution is scheduled to launch in 2022, and is expected to have broader neurodegenerative disease applications in the longer term, including in Parkinson's, Huntingdon's, and Alzheimer's diseases, and amyotrophic lateral sclerosis. Octave is engaging in partnership discussions with pharmaceutical companies interested in using its broad range of tools and capabilities, including custom serum biomarker panels, biology modeling, novel exploratory and secondary radiographic endpoints, and integrated multi-modality patient tracking applications.

"Applying precision tools to personalize management will address the unmet needs of those living with, treating, and researching MS," said Hagstrom. "We believe our comprehensive MS Care Solution will create a new paradigm for treating MS and a broad range of neurodegenerative diseases."

CONTACT

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