DEVoTED - Digital decision support system to avoid therapy resistance during treatment of depression

Aim of the Project

DEVoTED develops an empirically validated, data driven, digital clinical decision support system (CDSS). It will support doctors to stratify patients rationally into therapy resistance groups based on large scale data analysis and current medical knowledge. The stratification will help to provide targeted, individualised therapy decisions. The CDSS will help to judge the risk for therapy resistance already during the initial assessment at hospitalisation and therefore will reduce the number of trial-and-error treatments, reduce the treatment duration and the risk of chronification. The patient specific gain in quality of life and health is accompanied by a reduction of health care and social cost.

Background

"Depression is a common and disabling mental disorder. Epidemiological studies estimate that roughly 7% of the adult population in Europe and the USA experiences a major depressive disorder (MDD) per annum [1,2]. Projections of the World Health Organization suggest that by 2030, unipolar depression will be the leading cause of burden of disease in high-income countries and rank second worldwide [3]. In Europe alone every year 30 million patients are treated for depression with cumulative social cost at 92 billion €.

Nonresponse to the first prescribed antidepressant is a frequent clinical problem [4,5]. Only about 30% of patients with nonpsychotic MDD achieve symptom remission, the goal of depression therapy, on initial treatment with the selective serotonin reuptake inhibitor (SSRI) citalopram. Over 50% do not respond sufficiently and 15.8% experience intolerable side effects (SE) [6]. As antidepressant resistance is a complex phenomenon involving many factors (e.g. comorbid anxiety disorders, personality features) [7] no clear guidelines for treatment decision exist. Therefore, the selection and dosing of an antidepressant has to follow a trial and error algorithm, prolonging the time until an effective treatment is found.

Approach

Biomax Informatics AG and the Max-Planck-Institute for Psychiatry (MPIP) collaboratively develop a CDSS for early risk assessment of therapy resistance to improve therapeutic decisions in depression treatment.

The MPIP clinic will evaluate and validate the CDSS in clinical practice. The stratification of patients into therapy resistance risk groups will be based on individual assessment profiles mapped into large scale cohort data as well as current medical knowledge. To this end a systematic literature review, clinical expert knowledge and data from existing extensive, multi-dimensional clinical studies will be integrated. Data analysis and predictive model development by an artificial intelligence based machine learning approach. The predictive models will be validated with independent clinical studies and integrated into a high usability, browser based graphical user interface. The validation of the final CDSS will occur in clinical practice as well as within a network of local practitoners.

References

1. Kessler RC, Chiu WT, Demler O, Walters EE: Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the national comorbidity survey replication. Arch Gen Psychiatry 62(6), 617-627 (2005).
2. Wittchen HU, Jacobi F, Rehm J et al.: The size and burden of mental disorders and other disorders of the brain in Europe 2010. Eur Neuropsychopharmacol 21(9), 655-679 (2011).
3. Mathers CD, Loncar D: Projections of global mortality and burden of disease from 2002 to 2030. PLoS Med 3(11), e442. doi:410.1371/journal.pmed.0030442 (2006).
4. Fava M, Davidson KG: Definition and epidemiology of treatment-resistant depression. Psychiatr Clin North Am 19(2), 179-200 (1996).
5. Souery D, Papakostas GI, Trivedi MH: Treatment-resistant depression. J Clin Psychiatry 67 (Suppl 6), 16-22 (2006).
6. Trivedi MH, Rush AJ, Wisniewski SR et al.: Evaluation of outcomes with citalopram for depression using measurement-based care in STAR*D: implications for clinical practice. Am J Psychiatry 163(1), 28-40 (2006).
7. Bennabi D, Aouizerate B, El-Hage W et al.: Risk factors for treatment resistance in unipolar depression: a systematic review. J Affect Disord 171, 137-141 (2015).

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