



Suicide Risks and Prevention, Neuropathogenic Study

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Abstract

Past clinical evidence suggests that there is partly an association between suicide risk/mortality and mentally health condition. It is an interesting subject for modern diagnostic implication and therapeutic targeting. As a result, neuropathy in brain and relevant treatment (eased by anti-depressive agents or herbs) can be extensively explored. In order to find useful way for cutting off unnecessary suicide-induced human mortality, mental-related genes or molecules study may move forwards suicide risk prediction, prevention, targeting and application. This perspective highlights emerging areas of human suicide and mental healthcare.

Keywords: Suicide, Neural genetics, Neural bioinformatics, Cerebral image, Suicide prediction, Neural-pathogenesis.

Abbreviations: PG-Pharmacogenomics, GWAS-Genome Wide Association Study PET-Position Emission Tomography, SPECT-Single-Photon Emission Computed Tomography, fMRI-functional Magnetic Resonance Imaging, AI-Artificial Intelligence, SSRIs-Selective Serotonin Reuptake Inhibitors.

Backgrounds

More recently, some medical knowledge and clinical evidence suggests that suicide events or episodes are partly associated with human mental condition and episode [1]. Some possible interactions and convergence between outside factors (socioeconomic catastrophe) and a number of mental health problems (co-morbidity with mental illness) overall contribute to human suicide tendency, events and mortality [1-4]. To further establish this clinical linkage, neuro-pathogenic study (mental-related genes or molecules) must be systematically investigated by biochemical, molecular, synaptic transmission and morphology comparisons and neuropathy study.

- Poor or increased appetite
- Agitation or slowing of movement
- Guilt or self-blame
- Anhedonia

Clinical Evidence and Events

Association between Mental Symptoms and Suicide Risks

Early clinical evidence for this association was observed in UK and worldwide (Table 1). When you look at television and newspapers, a lot of suicide mortality of celebrity and huge sports stars is reported all over the world. They want to kill themselves without any outside sign of socioeconomic reasons or pressure. Among these superstars, no any other causes (financially or physically) can lead to self-deny and seek suicides. Owing to this evidence, diagnosis and prevention of mental disorders may be a useful step for human suicide risk prediction and prevention.

Symptom Checklist for Depressive Episode

- Loss of interest or pleasure*
- Disturbed sleep

Worldwide; 15,629 cases		UK; 4,859 cases	
Mood disorders	35%	Mood disorders	42%
Substance disorders	22%	Schizophrenia	20%
Personality disorders	12%	Personality disorders	11%
Schizophrenia	11%	Alcohol dependent	9%
Anxiety disorders	6%	Drug dependent	4%
		Anxiety disorders	3%
Other disorders	14%	Other disorders	11%

Table 1: A linkage between suicide and different mental disorder.

Checklists for Neuro-Pathological Identifications

- Inorganic elements in brains (Ca⁺⁺, Mg⁺⁺, Na⁺, K⁺ & Cl⁻)
- Chemical transmitter (Noradrenergic, serotonin and dopamine)
- Synaptic transmission mechanisms (Receptors and trans-membrane transporter)
- Genetic or epigenetic of key molecules (Enzymes, kinases and phosphatases)
- Molecular or pathway networks-major part of neural morphology and function (Gene knock-out, genomic editing)
- Neural-cytology (Opto-genetics and morphology)
- Cerebral location (Hippocampus)
- Cerebral images (Size, mass and density)

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Scientific Discovery

Symptom, etiologic or pathogenic progresses for suicide/mental illnesses is gradually accumulated and discovered [5]. By human mental illness diagnostic or therapeutic studies, we may receive enough important data and linkage to overcome suicides at the earliest. Regarding potential therapeutics, cerebral morphological changes, Pharmacogenomics (PG) and other molecular technology are utilized and associated with [6-12].

Major Disciplines

Genome Wide Association Study

The accumulating common and rare inheritable alleles and loci by GWAS (Genome Wide Association Study) data are expanding rapidly, which may be translated into fundamental knowledge, theories and clinical utility (diagnosis and therapeutics in the clinic) [13-14]. It may be used to explain whether the mixture of genetic or environmental factors may lead to human psychiatric disorders and human suicides?

Personalized Medicine

Safety and suicide risk is still largely reliant on empirical observation rather than large-sized cohort investigations (systematic and random) in the clinic. The best genetic or molecular candidates for drug therapy predictions in the clinic are unclear so far. Genetic panels optimizing among metabolic, drug-active and drug-toxic genes (genetic, epigenetic, molecules and pathways) might be inevitable for in-depth biomedical investigations of the core structure and network of patient's suicides and mortality.

Cerebral Images in Volume of Functional Areas and Regional Density

Cerebral image changes in cortical and sub-cortical areas in brain are evidenced in early neuro-imaging studies from patients at high suicide risks or mental illnesses. Since human suicide/mental illness are probably brain diseases, brain image changes of both volumetric and regional compartments can be generally observed by brain imaging scanning techniques of Position Emission Tomography (PET), Single-Photon Emission Computed Tomography (SPECT) or functional Magnetic Resonance Imaging (fMRI) [6-9]. This type of cerebral image system is not well applied in the clinic. But it may be improved by software imperfection or Artificial Intelligence (AI).

Neuropathology

Signal Pathways and Neural Transmitters

Signal pathways, such as neural transmitters, transporters, receptors and activators/inhibitors are especially important for human suicide study worldwide [15,16]. These fields of basic neural functional studies (Selective Serotonin Reuptake Inhibitors, SSRIs) and others are widely translated to clinical paradigm promotion and therapeutic modality establishment.

Different Categories of Drugs

Different types of drugs may affect the diagnostic/therapeutic outcomes. Antibiotics-induced mania or hearing losses and so on are also associated with unknown mental symptoms and suicides [17]. It is a meaningful job and world-wide cooperation may be more useful (Figure 1).

Future Directions

- Neuropsychiatric (cognitive, behavior and emotional) study of suicide risks, predictions, preventions and different types of therapeutics [18].
- Mathematics or computational network for suicide study (artificial intelligence and diagnostic analysis and deduction).

- Personalized medicine in the clinic (pharmacogenetics and biomarkers) [11].
- New animal models, state-of-the-art techniques and avant-garde lab instrument (genetic-knock-out, genomic editing)
- Borrow lesson from similar categories of diseases and drugs, such as herbal medicine [19-20].
- The relationships between genetic polymorphisms, biomedical or pathogenesis factors (bioinformatics), medicinal chemistry and environments vs. clinical therapeutic efficacies with different types of drugs.

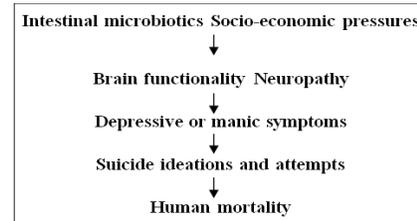


Figure 1: Proposed pathways for suicide origin and therapeutic targeting.

Conclusion

The clinical suicidal episodes and mortality is a life-threatening events. More sophisticated techniques and statistical analysis are needed to widening our diagnostic and therapeutic arsenals. This is an inevitable pathway for clinical diagnosis and drug developments. Its improvement is dependent on new ideas, pathologic discovery, modern technology utility and drug development renovations.

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