

CHOOSING PSYCHIATRIC PATIENTS FOR PSYCHO-SURGERY

Dr. Pezhman Hadinezhad

Fellowship of Neuropsychiatry and Behavioral Neurology

Tehran University of Medical Sciences

INTRODUCTION

Despite the advances in pharmacotherapy for treating some psychiatric disorders like anxiety disorders, obsessive-compulsive disorder, depression, and schizophrenia, many patients become refractory and will not respond to pharmacologic treatments.

Clinicians are beginning to reconsider neuromodulation surgery as a last resort for the treatment of these patients.

Neurosurgical interventions aimed at treating psychiatric disorders are grouped into destructive (ablative psychosurgery) or selective stimulation (neuromodulation psychosurgery).

HISTORY



The use of surgery for the treatment of psychiatric diseases is not a new concept.



In 1881, Gottlieb Burckhardt, a Swiss psychiatrist, reported on six patients that he performed surgery to treat aggressive behavior and hallucinations with partial results.

Three decades later, Puusepp operated in 1910 on three manic-depressive patients by interrupting the frontal fibers to the parietal cortex.



Fulton and Jacobsen's classical experiments on two chimpanzees that received frontal lobe surgical ablation to improve neurotic behaviors were an inspiration for subsequent human ablative procedures.



In 1935, a Portuguese neurologist named Egas Moniz first introduced a surgical procedure called prefrontal leucotomy.

- Moniz believed that abnormal connections to the frontal lobe caused some psychiatric problems and that surgically removing the white fibers connecting the frontal lobe with the rest of the brain will help mental health conditions.
- Moniz technique was later widely utilized in Europe and the United States.
- Moniz was awarded the Nobel prize in 1949 for his contributions.





Before introducing pharmacotherapy for psychiatric disorders, approximately 10,000 leucotomies were done in the United States and the United Kingdom.



A few years later, this number had increased significantly, with over 60,000 procedures performed.



With the introduction of chlorpromazine in 1954, it was estimated that 2 million patients received the drug during its first year.



The arrival of new diagnostic techniques and the ability to integrate information from different diagnostic modalities made it possible for clinicians to understand the brain structure and function and help localize brain pathologies.



Some of these diagnostic techniques include functional magnetic resonance imaging (fMRI), positive emission tomography (PET), neurophysiologic data from an electroencephalogram, magnetoencephalography, and transcranial magnetic stimulation (TMS).

HOW TO CHOOSE THE PATIENT?

- Laboratory workup is performed to exclude primary organic etiologies that may mimic psychiatric disorders.
- Neuroimaging studies include brain magnetic resonance imaging (MRI) and computed tomographic (CT) scans of specific body areas as needed.
- While diagnostic tests can be used, in most cases, they are used to rule out other organic causes that may be presenting as a psychiatric problem.
- A careful history and physical examination are fundamental tools for diagnosing and treating psychiatric disorders.

Only patients with severe, chronic, disabling, and treatment-refractory psychiatric illness should be considered for surgical intervention.

Psychiatric disorders that might benefit from surgical intervention include OCD and Major Affective Disorder (Unipolar Major Depression or Bipolar Disorder).

Schizophrenia diagnosis is not currently considered a clear indication for surgery.

TREATMENT-RESISTANT OCD

Treatment-resistant OCD refers to obsessive-compulsive disorder (OCD) that does not respond adequately to standard treatments, including first-line therapies such as selective serotonin reuptake inhibitors (SSRIs) and/or cognitive-behavioral therapy (CBT) with exposure and response prevention (ERP).



This term is used when patients experience persistent and significant symptoms despite receiving appropriate and well-established interventions.

The criteria for “treatment resistance” typically include:

1. Failure to achieve adequate symptom reduction: despite using appropriate SSRIs at therapeutic doses and/or engaging in CBT for an extended period (usually 12-16 weeks or longer).

2. Persistent symptoms: OCD symptoms remain severe enough to impair functioning and quality of life.

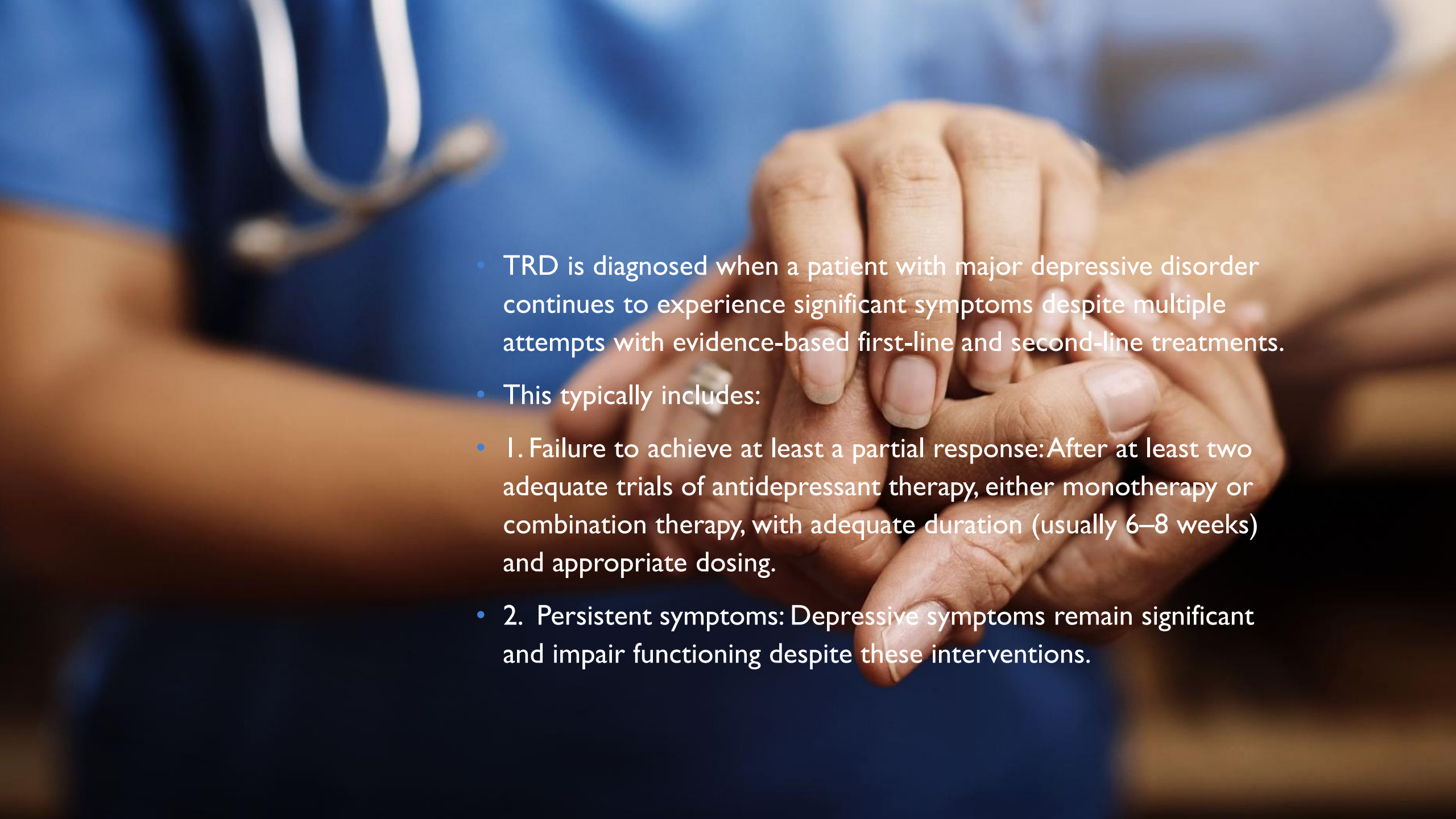
TREATMENT-RESISTANT DEPRESSION (TRD)



Treatment-resistant depression (TRD) is generally defined as depression that does not respond adequately to at least two different classes of antidepressant treatments given at adequate doses and for an appropriate duration (typically 6-8 weeks).



These treatments may include medications, psychotherapy, or a combination of both.

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- TRD is diagnosed when a patient with major depressive disorder continues to experience significant symptoms despite multiple attempts with evidence-based first-line and second-line treatments.
 - This typically includes:
 1. Failure to achieve at least a partial response: After at least two adequate trials of antidepressant therapy, either monotherapy or combination therapy, with adequate duration (usually 6–8 weeks) and appropriate dosing.
 2. Persistent symptoms: Depressive symptoms remain significant and impair functioning despite these interventions.

ABLATIVE PROCEDURES

Including:

Cingulotomy

Anterior capsulotomy

Subcaudate tractotomy

And limbic leucotomy, are psychosurgical procedures still used today in some cases.

DEEP BRAIN STIMULATION

The concept of DBS in treating psychiatric disorders can be attributed to its success in treating movement disorders like Parkinson's disease, essential tremor, and dystonia.

Current research and clinical experience have shown promising results in the use of DBS in treatment resistant OCD, anxiety disorders, depression, and trials are underway for the utilization of this procedure in the treatment of schizophrenia.



DBS modulation can use several different targets, but current literature does not demonstrate clear superiority among these targets.



For depression and other major affective disorders, DBS to the subcallosal cingulate, nucleus accumbens, ventral striatum, or inferior thalamic peduncle has provided good results in 50-70% of the patients.

For OCD, traditional ablative lesions include anterior cingulotomy, capsulotomy, subcaudate tractotomy, and limbic leucotomy.

DBS to anterior limb internal capsule, ventral capsule, dorsal striatum, nucleus accumbens, subthalamic nucleus, inferior thalamic peduncle, or globus pallidus internus produces a positive response in 40-90% of the patients

Tourette's syndrome (TS) is a recognized idiopathic neuropsychiatric disorder affecting approximately 1% of the population.

Dysfunction in the cortico–basal ganglia–thalamocortical network is thought to be the pathophysiologic basis of impairment.



DBS of the thalamus, globus pallidus internus, globus pallidus externus, internal capsule, or nucleus accumbens has been used to treat refractory TS.



SUBSTANCE USE DISORDER

- Case reports for neuromodulation of the nucleus accumbens, and the anterior limb of the internal capsule has successfully been used for preventing heroin use relapse.

VAGAL NERVE STIMULATION

Vagal nerve stimulation (VNS) was initially developed to treat medical treatment-resistant epilepsy.

It was noted that many patients improved their depressive symptoms even if their seizures were not controlled.

It is now used to treat chronic and treatment-resistant depression and anxiety disorders.

The surgical and psychiatric side effects reported are rare and involve hypomania, mania, and in some cases, worsening of depression and increase suicide risk.

شناسنامه و استاندارد خدمت

Vagal Nerve Stimulation
VNS

نسخه دوم

زمستان ۱۴۰۳

(و افراد صاحب صلاحیت جهت تجویز (Order) خدمت مربوطه و استاندارد تجویز:

- ۱- فلوشیپ صرع در اندیکاسیون صرع
- ۲- متخصص نورولوژی با سابقه حداقل ۱۰ سال فعالیت در صرع در مرکز دانشگاهی (در اندیکاسیون صرع
- ۳- فلوشیپ روانپزشکی عصبی و نورولوژی رفتاری در مورد افسردگی
- ۴- مناسب است برای ارجاع بیمار در مانگاه مولتی دیسپلینری با تخصص های ذیل تشکیل گردد . فلوشیپ صرع یا متخصص نورولوژی با سابقه حداقل ۱۰ سال فعالیت در صرع در مرکز دانشگاهی)، متخصص جراحی مغز و اعصاب با سابقه حداقل ۲ سال فعالیت در مراکز دانشگاهی مولتی دیسپلینری صرع و یا (فلوشیپ جراحی صرع که مدرک مورد تایید وزارت متبوع را داشته باشد)، فلوشیپ روانپزشکی عصبی و نورولوژی رفتاری

- A 5-year, prospective nonrandomized study conducted at many centers in 795 patients with a major depressive episode showed effective outcomes in treatment-resistant depression using VNS.
- It has also been studied in OCD patients with some case reports showing some improvement but not as promising as affective disorders.

PROGNOSIS

Despite the initial lousy reputation of ablative psychosurgery, modern cingulotomy offers positive outcomes in nearly 70% of patients with OCD and about 75% of patients with major depression on the five-year long-term follow-up.

Anterior capsulotomy with radiosurgery in patients with intractable OCD offers more than 70% of response at a 5-year follow-up.

For alcohol dependence and intractable AN, bilateral stereotactic radiofrequency ablation of the nucleus accumbens offers remission rates of 64-82%.

Bilateral cingulotomy for heroin addiction offers a remission rate of 45%.



For DBS, the response rate varies depending on the psychiatric disorder and the target.



For OCS, the internal capsule provides a response in 55% of the patients, the anterior capsule/striatum a response in 62% with remission in 6%, the inferior thalamic peduncle a response in 100%, the nucleus accumbens a response in 38%, and the subthalamic nucleus a response in 50%.



For major affective disorder, the anterior capsule/striatum provides a response in 40% with remission in 25% of the patients, the cingulate a response in 58% and remission in 28%, and the nucleus accumbens a response in 48% and remission in 5%.



Only case reports and case series have been published for TS, documenting a wide range of improvements (46% to nearly 100%).

COMPLICATIONS

Seizures

Intracranial hemorrhage

Hypomania

Mania

Worsening of depression

Increase suicide risk

Battery changes requiring reoperations

Hardware malfunction

Infections

Electrode misplacement

Skin erosion

Hemiparesis



THANKS FOR YOUR ATTENTION