Major depressive disorder

- Psychiatric Outcomes of Subthalamic Nucleus Deep Brain Stimulation: A Systematic Review of Short- and Long-Term Effects
- Depression after aneurysmal subarachnoid hemorrhage: development of a screening tool and discharge user interface
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- Peripheral MicroRNA Signatures in Adolescent Depression
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Depression has been associated with poor outcomes in neurosurgical patients, including increased pain, poorer functional recovery, delayed return to work, and decreased patient satisfaction.

The Beck Depression Inventory (BDI, BDI-1A, BDI-II), created by Aaron T. Beck, is a 21-question multiple-choice self-report inventory, one of the most widely used psychometric tests for measuring the severity of depression.

Etiology

Depression is found to be associated with up-regulation of inflammatory cytokines. However, the relationship in high grade glioma (HGG) patients is still unclear. In a prospective study, a total 132 HGG patients participated in blood sample collection for inflammatory cytokines detection by ELISA, mental status, quality of life (QOL) and physical functional status testing. The association between inflammatory cytokines and depression risk was assessed using conditional logistic regression. The incidences of depressive symptoms and depression in high grade glioama patients were 45.5 and 25 % respectively during 12 months follow-up. We found the risk of depression was elevated with increased C-reactive protein (CRP) and interleukin-6 (IL-6) in high grade glioma patients after adjustment of confounders. The serum levels of CRP and IL-6 in patients with transient depression and depression were higher than those without depressive symptoms. In addition, depression had significant effects on the survival, QOL and physical functional status of patients. Depression is prevalent among patients with HGG. The present study suggests that serum CRP and IL-6 may serve as a depression marker for HGG patients. The survival and quality of life of HGG patients may be improved by an effective management for depression [1)].

This article was retracted [2)].

Depression and cervical spine surgery

Quality of life (QoL) has been identified as one of the most important outcome measurements following cervical spine surgery. The contributing factors to post-operative QoL remain limited.

A study of Yang et al. aimed to prospectively examine the QoL and related pre-operative emotional factors in patients who underwent anterior cervical spine surgery.

A total of 124 patients who underwent anterior cervical spine surgery were recruited. All participants were prospectively evaluated for their QoL and 2 aspects of emotion, depression and anxiety, before and after surgery, respectively.

Pre-operatively, 13% of patients showed signs of depression and 31% of patients reported symptoms of anxiety. Post-operatively 14% of patients reported depression, but 41% reported symptoms of anxiety. A significant association between depression, anxiety and different domains of QoL were identified, and specific cut-off points of pre-operatively depressive and/or anxiety levels to predict unfavorable postoperative QoL was further established.

This prospective study demonstrated specific emotional factors, specifically depression and anxiety, influence patients' QoL following surgery. These results suggest clinicians should also monitor patients' emotional adjustments with their physical conditions [3].

Depression after brachial plexus injury

Data were collected retrospectively on all patients who underwent brachial plexus reconstruction to restore elbow flexion between 2005 and 2013. Elbow flexion, graded via the Medical Research Council scale, was assessed at latest follow-up. Multiple variables, including the presence of Axis I psychiatric diagnoses, were assessed for their association with the dichotomous outcome of Medical Research Council scale score ≥3 (antigravity) vs <3 elbow flexion. Standard statistical methods were used.

Thirty-seven patients met inclusion criteria. The median postsurgical follow-up time was 21 months. Operations included neurolysis (n = 3), nerve graft repair (n = 6), and nerve transfer (n = 28). Depression was present in 10 of 37 patients (27%). Of variables tested, only depression was associated with poor elbow flexion outcome (odds ratio: 6.038; P = .04).

Preoperative depression is common after brachial plexus injury. The presence of depression is associated with reduced elbow flexion recovery after reconstruction. Our data suggest assessment and treatment of preoperative mental health is important in designing a comprehensive postoperative management plan to optimize outcomes and patient satisfaction [4].

Brain tumor

Depression as well as anxious and OCD psychopathology were shown to be prevalent signs among patients with intracranial tumor. Diagnosis of symptoms were totally based on DSM-IV criteria and these disorders and the percentiles don't seem to be related to each other. Due to high variability of tumor stages, statistical analysis of whether the mentioned psychiatric symptoms get worsen at the later stages of the tumor genesis was not feasible. Although not measured directly, psychiatric symptoms seem to get worsen at the later stages of the brain tumor. The associated factors are tumor location, patient's premorbid psychiatric status, cognitive symptoms and adaptive or maladaptive response to stress [5].

Treatment

Major depressive disorder treatment.

Pathogenesis

analysis identified 147 upregulated genes and 402 downregulated genes were identifiedin the cortex of MDD patients compared with that of the controls.. Enrichment analyses revealed that DEGs were predominantly enriched in synapse-related cell functions, linoleic acid metabolism, and other pathways. PPI analysis identified 20 hub genes based on the total score. The changes in KDM6B, CUX2, NAAA, PHKB, NFYA, GTF2H1, CRK, CCNG2, ACER3, and SLC4A2 in the peripheral blood of MDD patients were consistent with those in the brain. Furthermore, the prefrontal cortex of mice with depressive-like behaviors showed significantly increased Kdm6b, Aridb1, Scaf11, and Thoc2 expression and decreased Ccng2 expression compared with that of normal mice, which was consistent with the results found for the human brain. Potential therapeutic candidates, such as Citron, Fructus Citri, Leaves of Panax Notoginseng, Sanchi Flower, Pseudoginseng, and Dan-Shen Root, were selected via TCM screening.

Conclusions: This study identified a number of novel hub genes in specific brain regions involved in the pathogenesis of MDD, which may not only deepen our understanding of depression but also provide new ideas for its diagnosis and treatment [6)]

Clinical features

The decreased ability of reasoning and problem-solving in major depressive disorder may be due to the decreased integrity of the white matter fibers of the body of the corpus callosum [7)].

Diagnosis

The diagnosis of major depressive disorder is based on the patient's self-reported experiences, behavior reported by relatives or friends, and a mental status examination. There is no laboratory test for major depression, although physicians generally request tests for physical conditions that may cause similar symptoms. The most common time of onset is between the ages of 20 and 30 years, with a later peak between 30 and 40 years.

The subcallosal cingulate gyrus CG25 which consists of BA25 as well as parts of BA24 and BA32 has been implicated as playing an important role in major depression and has been the target of deep brain stimulation to treat the disorder.

One study found that BA25 is metabolically overactive in treatment resistant depression.

A different study found that metabolic hyperactivity in this area is associated with poor therapeutic response of persons with Major Depressive Disorder to cognitive-behavioral therapy and venlafaxine.

In 2005 Helen S. Mayberg and collaborators described how they successfully treated a number of depressed people — individuals virtually catatonic with depression despite years of talk therapy, drugs, and electroconvulsive therapy — with pacemaker-like electrodes (deep brain stimulation) in area 25.

A recent study found that Transcranial magnetic stimulation is more clinically effective treating depression when targeted specifically to Brodmann area 46, because this area has intrinsic functional connectivity (negative correlation) with area 25.

Another recent study has found that the responses of area 25 to viewing sad stimuli are affected by cortisol.

This suggests that depression related changes in the activity in area 25 could be due to Hypothalamic–pituitary–adrenal axis dysregulation [8].

A study examined, for the first time, olfactory memory and discrimination in the Flinders Sensitive Line (FSL) rodent model of depression. Male FSL rats and controls were trained on an Olfactory Discrimination (OD) and a Social Interaction (SI) test. On the OD test, the FSL and controls performed similarly at the shortest inter-trial interval (5min), however, with extended delay of 30min, the FSLs had a recall and odor discrimination deficit. At the longest delay (60min) both groups performed poorly. The FSL rats i.) had a deficit in olfactory discrimination suggesting impairment in olfactory memory and recall; ii.) were less likely to socialize with unfamiliar rats. The data suggests that FSL animals have an impaired olfactory information processing capacity [9].

Hamilton Depression Rating Scale.

Research

EVs were extracted from NSCs. The depression rat model was established by corticosterone (CORT) induction and treated with NSC-EVs. The depression behavioral/pathological changes in rats were assessed using forced swimming test, open field test, sucrose consumption test and western blotting. The neuronal apoptosis in hippocampal tissue were detected. CORT-induced PC12 cell model was established. EV uptake by PC12 cells was measured and PC12 cell apoptosis was detected. The downstream targets of miR-16-5p were predicted and verified. The expressions of miR-16-5p and MYB in rats, PC12 cells, and EVs were measured. Functional rescue experiments were conducted to verify the role of miR-16-5p and MYB in PC12 cell apoptosis.

CORT induction increased neuronal apoptosis in hippocampal tissue and induced depression-like behaviors in rats, while NSC-EV treatment improved depression-like behaviors and apoptosis in rats. In PC12 cells, NSC-EVs decreased CORT-induced PC12 cell apoptosis. NSC-EVs carried miR-16-5p into PC12 cells. miR-16-5p knockdown in EVs partially reversed the inhibitory effects of NSC-EVs on CORT-induced PC12 cell apoptosis. miR-16-5p targeted to inhibit MYB to repress CORT-induced PC12 cell apoptosis. In vivo experiments further verified that NSC-EVs reduced neuronal injury in CORT-induced depression rats via the miR-16-5p/MYB axis.

NSC-EVs-mediated alleviation on neuronal injury by carrying miR-16-5p to target MYB was highly

likely one of the mechanisms by which NSC-EVs mediated miR-16-5p in neuroprotection of depression rats [10)]

Case series

A study of Sorri et al. from the Tampere University Hospital in Finland, included thirty patients suffering from major depressive disorder (MDD). Their serum and plasma brain derived neurotrophic factor (BDNF) levels were examined before electroconvulsive therapy (ECT) (baseline) and after the first, fifth, and last ECT session. The severity of the depression and the response to ECT were measured with Montgomery-Asberg Depression Rating Scale (MADRS).

Electroconvulsive therapy caused no significant changes in serum BDNF levels. Plasma BDNF levels decreased during the fifth ECT session between the baseline and the 2-hr samples ($p = 0.019$). No associations were found between serum or plasma BDNF levels and remission. The correlations between plasma and serum BDNF levels in each measurement varied between 0.187 and 0.636.

Neither serum nor plasma BDNF levels were systematically associated with the clinical remission. However, the plasma BDNF levels somewhat varied during the ECT series. Therefore, the predictive value of BDNF for effects of ECT appears to be at least modest [11)].

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