Neuropsychiatry Issues After Stroke

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DISCLOSURE

• NO CONFLICT OF INTEREST. NO INDUSTRY AFFILIATION.

• Further “personal disclosures and biases”: The Blue Jays suck, TFC sucks, the Argos suck the Raptors suck, but the Maple Leafs... really suck!!
OBJECTIVES

• To understand the persistent dichotomy of brain vs. mind and its effects.

• Conceptualize the different neuropsychiatric entities present after stroke.

• Raise awareness of the common syndromes post stroke.

FRANKLY...TO STAY AWAKE AND HAVE FUN WHILE LEARNING
Neurons and Synapses Lost During Stroke

• Average ischemic stroke volume 54 mL.

• Average duration of stroke evolution 10 hours

• **1.2 billion neurons (8.3 trillion synapses)** are lost in an average stroke left untreated!

• Equivalent to 36 years of aging!

Saver J. *Stroke* 2006
Brain? Mind?

“Cogito Ergo Sum” ("I think, therefore I am")

ABOUT WAX MELTING TO LIQUID:

“And so something which I thought I was seeing with my eyes is in fact grasped solely by the faculty of judgment which is in my mind”

(The liquid remains wax and not water)
Rene Descartes  (31 March 1596 – 11 February 1650)

DUALISM: mind is different than matter (brain)
mind is non material.
Neuropsychiatric syndromes in Stroke.

- Depression.
- Mania.
- Anxiety.
- Psychosis.
- Cognitive Behavioural Syndromes:
  - Frontal Syndromes.
  - Neglect syndrome.
  - Anosognosia.
  - Apathy syndrome.
  - Anger and aggression.
• CLINICAL CASE
Mr. M.

- 62 y.o. man, single. Born in France.
- From an early age developed musical talent. Became a professional musician and composer. Toured often.
- Previously in good health.
- Active swimmer and walker.
- Rejected for regular mandatory army service due to a hernia and his slight build. Was allowed to enlist as a driver.
- Developed chronic sleeping problems.
Mr. M.

- Mid-age: Developed “exhaustion”. Three months off.
- One year later his mother died.
- He developed a “prolonged state of sadness and grief”, worsening of insomnia. Drop in productivity. Stopped performing and composing.
- Partially recovered over the next year with a number of medications.
- Began touring again. Mood improved.
Mr. M.

- Mid-fifties: He started having gradual problems expressing himself.

- He still played and was able to compose, but his capacity to write music deteriorated.

- While travelling in a taxi, was involved in an accident. Details are unknown. Not clear if he lost consciousness or had a head injury.

- After the accident his writing deteriorated further. Many grammatical mistakes.
Mr. M.

- His word finding capacity worsened.
- Concentration deteriorated.
- Accepted a commission to write the soundtrack for a movie but his progress was so slow that he lost the job.
- Became sad and withdrawn again.
Mr. M.

- “I still have music in my head, I can hear it, but it can’t be written”.
- Was often intermittently confused.
- While swimming he lost the capacity to move the right side of his body. Was rescued and taken to the hospital.
- Diagnosed with a stroke and aphasia.
DEPRESSION

• Depression is a common emotional disorder affecting about 7% (1.3-1.4 million people) in any given year.

• Only 20% of those who experience depression will receive an appropriate treatment plan.

• 16% of all adults will experience depression.

• 97% of those suffering from depression say their work, home life, and relationships are negatively affected.
How Common is Depression?

• The *lifetime prevalence* of major depressive episode was 12.2%.
  (Breast Cancer: 10%)

• Past-year episodes were reported by 4.8% of a large sample.

• 1.8% reported an episode in the past 30 days.

• The *peak annual prevalence* occurred in the group aged 15 to 25 years.
DEPRESSION

• Not related to level of education.
• Related to having a chronic medical condition, to unemployment, and to income.
• Married people had the lowest prevalence
• But the effect of marital status changed with age.
• Annual prevalence may increase with age in men who never married.
Depression: DSM-IV
5 of 9 Required

- Depressed mood*
- Loss of interest or pleasure*
- Change in sleep
- Change in appetite/weight
- Low energy/fatigue
- Psychomotor agitation/slowing
- Low self-esteem or guilt
- Poor concentration
- Thoughts of suicide or death
Depression

- 3 sets of symptoms and signs: Cognitive, Behavioural and Neuro-vegetative.
- Lasting at least 2 weeks.
- Associated with impaired day to day functioning.
- NOT associated with a medical condition or effects of a substance.
- In acquired brain illness:
  “Depression due to... (a general medical condition)”. 
Depression: clinical picture

• PSYCHOLOGICAL: Hopelessness, guilt, shame, thoughts of death; helplessness, poor self concept; anger, impatience, irritability.
• BEHAVIOURAL: fatigue, anhedonia, apathy, social withdrawal, lassitude.
• COGNITIVE: poor attention, poor concentration, slow thinking process, dysmnesia etc.
Depression: A SAD FACE(S)

A - Appetite
S - Sleep
A - Anhedonia
D - Depressed mood
F - Fatigue
A - Agitation
C - Concentration
E - Esteem
S - Suicidal

Natural History of Untreated Depression

Balancing evidence and opinion in stroke care: the 2008 best practice recommendations

Mark Bayley MD, Patrice Lindsay BScN PhD, Chelsea Hellings BScH, Elizabeth Woodbury BCom MHA, Stephen Phillips MBBS, on behalf of the Canadian Stroke Strategy (a joint initiative of the Canadian Stroke Network and the Heart and Stroke Foundation of Canada)

Research in stroke care is generating new information at a rate that challenges our ability to effect health-system change in a timely manner. For example, 10 years after publication of a meta-analysis showing that delivery of care in a specialized stroke unit reduced the likelihood of death and disability by up to 30%, fewer than one-third of patients with acute stroke who were admitted to Canadian hospitals received this type of specialized care.

The Canadian Stroke Strategy has prepared an update to its 2006 Canadian Best Practice Recommendations for Stroke Care that we hope will help to close this gap in knowledge transfer. In this commentary, we highlight new evidence in stroke care that was incorporated into the recommendations during the update process, discuss areas where it was challenging to find a balance between research evidence and expert opinion, and review the implementation issues identified by a national consensus panel.

In the supplement appearing with this issue of CMAJ (see www.cmaj.ca/content/vol179/issue12#supplement), we present best practice recommendations for stroke care in 27 topic areas, 23 updated from the 2006 version of these guidelines and 4 covering new topic areas.

Over the past 18 months, expert task groups revised the recommendations released in 2006 and developed the 4 new recommendations. A national consensus panel met in April 2008 to confirm the updated recommendations. Two of the recommendations from the 2006 version of the stroke best practices — those for antithrombotic therapy unless there is an indication for anticoagulation, and that either ASA, ASA combined with extended-release dipyridamole, or clopidogrel may be used, depending on the clinical circumstances — Critics may be concerned that this does not provide sufficient guidance, but the recommendation is intended to convey the importance of sustained long-term antithrombotic therapy while allowing the prescribing physician to tailor treatment to the individual patient.

We also revised the recommendation on thrombolytic therapy (recommendation 3.5) on the basis of data from part 3 of the European Collaborative Acute Stroke Study (ECASS III) and an updated Cochrane review. The time window for beneficial treatment of ischemic stroke with intravenous administration of tissue plasminogen activator has been extended.
Box 1: Consensus panel’s priorities for implementation of the Canadian best practice recommendations for stroke care

- Management of transient ischemic attack and minor stroke*
- Outpatient and community rehabilitation*
- Development of stroke units*
- Management of stroke by emergency medical services
- Initial assessments for rehabilitation
- Blood pressure management*
- Provision of inpatient rehabilitation*
- Management of post-stroke depression*
- Carotid artery interventions*
- Anticoagulation in stroke patients with atrial fibrillation*

*Supported by the strongest levels of evidence.
Post Stroke Depression

- Prevalence: many large studies.
- In acute care or rehabilitation hospitals:
  - Major Depression: 22%
  - “Minor” Depression: 17%
  \[ \frac{22 + 17}{49} = 39\% \]
- In community settings:
  - Major Depression: 13%
  - “Minor” Depression: 10%
  \[ \frac{13 + 10}{23} = 23\% \]
- Robinson, Starkstein, Folstein, Herrmann, Andersen and MANY others.
  \[ 1977-2006 \]
Longitudinal prevalence and determinants of early mood disorder post-stroke.

Townend BS, Whyte S, Desborough T, Grimmins D, Markus R, Levi C, Sturm JW.

BACKGROUND: Early identification of mood disorder post-stroke (MDPS) or its determinants could improve stroke outcomes. However, the natural history, prevalence and determinants of MDPS within the first weeks post-stroke require further investigation. METHODS: Consecutive hospitalised stroke survivors were assessed within 2-5 days of stroke, and at 1 and 3 months post-stroke. Baseline data included demographics, co-morbidities, stroke subtype, pre-stroke disability and cognition. At baseline, 1- and 3-month interviews physical impairment, disability, cognition and social support were assessed. MDPS was defined as a score of >8 on the depression subscale of the Hospital Anxiety Depression Scale. Factors independently associated with MDPS at each time-point were determined using regression analyses. RESULTS: One hundred and twenty-five subjects were included. The prevalence of MDPS within 5 days and at 1 and 3 months post-stroke was 5%, 16% and 21% respectively. The independent determinants for MDPS at 1 month were disability, social support and change in impairment score between initial and 1-month assessments; and at 3 months were disability, social support and institutionalisation. Individuals moved in and out of the subset of depressed patients over time. MDPS was independently associated with mortality at 3 months post-stroke. CONCLUSION: Mood disorder post-stroke increases in prevalence over the initial weeks post-stroke despite an improvement in disability, and is associated with mortality. Patients with MDPS at 1 month were not necessarily affected at 3 months and vice versa, indicating the dynamic nature of MDPS in the early stages.
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CONCLUSION: Mood disorder post-stroke increases in prevalence over the initial weeks post-stroke despite an improvement in disability, and is associated with mortality. Patients with MDPS at 1 month were not necessarily affected at 3 months and vice versa, indicating the dynamic nature of MDPS in the early stages.
Post Stroke Depression

• Duration: mean frequency of major depression beyond 1 year post stroke: 26%.
• Most episodes: 9-10 months.
• Depression post *cortical* strokes longer recovery than subcortical and cerebellar strokes
Post Stroke Depression

- Localization: Left or Right
- Controversial.
- At initial evaluation: Left hemisphere.
- At short (3 months) and long term (>6 months) follow up: no significant differences between groups of right or left CVA and MDE.
- Physiologic changes causing PSD on the left side might be time specific?
Post Stroke Depression

- Localization: anterior vs. posterior.
- No controversy.
- Anterior lesions more commonly associated with PSD.
- Frontal pole.
Post Stroke Depression

- Depressed patients: less improvement at 2 years post CVA.
- Better performance on A.D.L.’s at 3 and 6 months in treated PSD.
- Cognitive impairment: PSD patients performed worse than non PSD controlling for location, type, side and population demographics.
- Treatment of PSD improved cognition.
Post Stroke Depression

Norepinephrine and 5HT pathways project from the brainstem through the median forebrain bundle to frontal cortex then posteriorly.

Lower serotonin binding in animal studies.
TREATMENT ISSUES

• HERE COMES TROUBLE...!
OBJECTIVE: To systematically assess treatment effects of antidepressants in patients with PSD, incorporating data from recent studies. METHODS: A meta-analysis of randomized placebo-controlled trials (RCTs) of antidepressants in patients with PSD was conducted, using published studies from 1984 to 2006. Outcome measures of antidepressant treatment included response rate, depression rating scale scores, recovery of neurologic impairments, and improvements in activities of daily living (ADLs) after stroke. The effect size was presented as rate difference (RD) and weighted mean difference for dichotomous outcomes and continuous outcomes, respectively. Pooled effect sizes were calculated by both fixed-effects and random-effects models. RESULTS: A total of 1320 patients who met inclusion criteria were identified from 16 RCTs. The pooled response rates in the active and placebo groups were 65.18% (234/359) and 44.37% (138/311), respectively. The pooled RD was 0.23 (95% CI 0.03 to 0.43), indicating a significantly higher response rate in the active group compared with the placebo group. From baseline to endpoint, patients in the active group had significantly greater improvement in depressive symptoms compared with patients in the placebo group. Longer duration of treatment was positively correlated with the degree of improvement in depressive symptoms (Spearman's correlation, \( \rho = -0.93, p = 0.001 \)). No consistent evidence was found for positive antidepressant effects on the recovery of neurologic impairments and improvements in ADLs. CONCLUSIONS: The results of this meta-analysis suggest that use of antidepressants among patients with a diagnosis of PSD is associated with improvement in depressive symptoms. Longer durations of antidepressant treatment may be associated with greater reductions in depressive symptoms.
Treatment effects of antidepressants in patients with post-stroke depression: a meta-analysis.

Chen Y, Guo JJ, Zhan S, Patel NC.
University of Cincinnati Medical Center, Cincinnati, OH

OBJECTIVE: To systematically assess treatment effects of antidepressants in patients with PSD, incorporating data from recent studies. METHODS: A meta-analysis of randomized placebo-controlled trials (RCTs) of antidepressants in patients with PSD was conducted, using published studies from 1984 to 2006. Outcome measures of antidepressant treatment included response rate, depression rating scale scores, recovery of neurologic impairments, and improvements in activities of daily living (ADLs) after stroke. The effect size was presented as rate difference (RD) and weighted mean difference for dichotomous outcomes and continuous outcomes, respectively. Pooled effect sizes were calculated by both fixed-effects and random-effects models. RESULTS: A total of 1320 patients who met inclusion criteria were identified from 16 RCTs. The pooled response rates in the active and placebo groups were 65.18% (234/359) and 44.37% (138/311), respectively. The pooled RD was 0.23 (95% CI 0.03 to 0.43), indicating a significantly higher response rate in the active group compared with the placebo group. From baseline to endpoint, patients in the active group had significantly greater improvement in depressive symptoms compared with patients in the placebo group. Longer duration of treatment was positively correlated with the degree of improvement in depressive symptoms (Spearman's correlation, \( \rho = -0.93, p = 0.001 \)). No consistent evidence was found for positive antidepressant effects on the recovery of neurologic impairments and improvements in ADLs.

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Poststroke Depression: A Review

Robert G Robinson, MD1; Gianfranco Spalletta, MD, PhD2

Objective: To review the world’s (English-language) publications related to depression following stroke.

Method: The databases from MEDLINE and PubMed were reviewed for articles related to poststroke depression (PSD), depression and cerebrovascular accident, depression and cerebrovascular disease, and depression and cerebral infarction.

Results: Most studies examined prevalence rates of depression and the clinical correlates of depression. Based on pooled data, the overall prevalence of major depression was 21.7% and minor depression was 19.5%. The strongest single correlate of depression was severity of impairment in activities of daily living. However, the presence of depression at baseline was found to be associated with greater impairment at follow-up, ranging from 6 weeks to 2 years in 83% of studies. Further, depression following acute stroke was also associated with greater cognitive impairment and increased mortality. PSD has been shown in 5 double-blind controlled studies to be effectively treated with antidepressants, and 1 study has recently shown that PSD can be effectively prevented.

Conclusions: During the past 20 years, significant progress has been made in the identification and treatment of depression following stroke. In the future, antidepressant treatment will likely play an increasing role in the management of patients with acute stroke. Further research is needed to identify the mechanisms of depression and why antidepressants lead to improved physical and cognitive recovery and decreased mortality.


Clinical Implications
- Depression occurs in about 40% of acute stroke patients.
- Depression is an independent factor leading to poor recovery and mortality.
- Depression may be effectively treated and prevented.

Limitations
- There is significant variability between studies in method of diagnosis.
- The time since stroke is crucial in assessing the course of depression.
- Further research on the mechanism of depression and mortality is urgently needed.

Key Words: poststroke depression, stroke-related impairments, prevalence
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The time since stroke is crucial in assessing the course of depression.
Further research on the mechanism of depression and mortality is urgently needed.
Mood after stroke: a case control study of biochemical, neuro-imaging and socio-economic risk factors for major depression in stroke survivors

Kausik Chatterjee, Susan Fall, David Barer

Abstract

Background: Though vascular factors may be important in the aetiology of late-life depression, it is not clear whether they have a major effect on the risk of depression after a stroke. We investigated the relationship between physiological, biochemical, neuro-imaging and socio-economic factors and late-phase post-stroke depression in a cross-sectional case-control study.

Methods: People living at home at least 9 months after a stroke were interviewed using a structured proforma. Depression was diagnosed according to DSM-IV criteria, together with a Montgomery Asberg (MADRS) score $>17$. Stroke survivors of similar age and functional status but without symptoms of, or recent treatment for, depression and with MADRS score $<7$, were recruited as controls.

Results: Stroke survivors with depression were more likely than controls to have been smokers, to have had hypertension or peripheral arterial disease, and to have had more than one stroke or multiple discrete brain scan lesions. In univariate analysis they had significantly higher blood pressure, lower Mini-Mental State (MMSE) scores, higher serum homocysteine and lower folate levels, as well as more extensive white matter and basal ganglia changes on brain scan. In logistic regression, previous hypertension (OR 3.4), peripheral vascular disease (OR 4.7), number of strokes (OR 2), MMSE score (OR 0.76) and basal ganglia changes (OR 2.2), were independently associated with depression.

Conclusion: These results suggest that patients with hypertension, hyperhomocysteinaemia and other factors associated with cerebral small vessel disease, may be more susceptible to post-stroke depression. Future intervention trials should focus on such high risk groups.

Background

Although depression is known to be common after a stroke, consistent risk factors are hard to identify from the literature and longitudinal studies suggest that coronary artery disease [4] and other vascular factors [5] have been found to be important.

The longstanding controversy over the relationship between the location of the stroke lesion, and the risk of
• Conclusion

• Results suggest that **history of multiple strokes, hypertension, smoking, peripheral vascular disease and visible discrete subcortical lesion or basal ganglia changes on baseline CT brain scans** had independent **association with major post-stroke depression at the chronic phase.**

• Furthermore, patients with major poststroke depression had greater degree of cognitive impairment, higher serum homocysteine and lower serum folate levels compared with stroke survivors of similar age and functional ability. Therefore, some risk factors for small vessel cerebro-vascular disease may also be risk factors for clinical depression in the chronic phase after stroke.
Depression–Executive Dysfunction Syndrome Relates to Poor Poststroke Survival

Susanna Melkas, M.D., Risio Valaja, M.D., Ph.D.,
Niko K. J. Oksala, M.D., Ph.D., Hanna Jokinen, Ph.D.,
Tarja Pohjasvuori, M.D., Ph.D., Ann I Oksala, M.D.,
Antero Leppävuori, M.D., Ph.D., Markku Kaste, M.D., Ph.D.,
Pekka J. Karhu, M.D., Ph.D., Timo Erkinjuntti, M.D., Ph.D.

Background: The aim of this study was to investigate the influence of poststroke depression and executive dysfunction on long-term survival after acute stroke. Methods: A total of 257 consecutive acute ischemic stroke patients were included in the study and followed up to 12 years. Depression was diagnosed 3 months after stroke in 99 patients (38.5%). Findings: In Kaplan-Meier analysis, there was no difference in survival of patients with and without poststroke depression (8.7 versus 8.3 years). Instead, patients with both depression and executive dysfunction had shorter median survival than patients with neither depression nor executive dysfunction (6.6 versus 10.3 years). Comparison between all patients with executive dysfunction and patients without it, not regarding depressive status, showed that executive dysfunction in itself was strongly associated with poor poststroke survival (6.4 versus 10.6 years). In stepwise Cox regression proportional hazards analysis adjusted with covariates, poststroke depression with executive dysfunction (hazard ratio [HR] 1.63) and advanced age (HR 1.11) remained as independent predictors of poor long-term survival. Interpretation: The authors' well-defined poststroke cohort with long-term follow-up indicates that in poststroke depression, the depression-executive dysfunction syndrome is the predictor of poor long-term survival rather than depression in itself (Ann J Geriatr Psychiatry 2010; 18:1007-1016)

Key Words: Poststroke depression, executive dysfunction, mortality
FIGURE 1. The Effect of Poststroke Depression on Overall Poststroke Survival (Endpoint: All Cause Death), as Determined by Kaplan-Meier Log-Rank Analysis

Cumulative survival

Time years

Patients at risk

No depression 8.3 years
Any poststroke depression 8.7 years

158 140 110 86 65 5 No depression
99 85 73 56 46 4 Any poststroke depression
FIGURE 2. The Effect of DES on Overall Poststroke Survival (Endpoint: All Cause Death), as Determined by Kaplan-Meier Log-Rank Analysis

Cumulative survival

Time years

Patients at risk

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OBJECTIVE:

To determine whether there is a relationship between inflammatory markers (serum C-reactive protein (CRP) and cytokines) and post stroke cognitive impairment (PSCI). Methods: This was a cross-sectional observational study. Patients were recruited from 4 sources: (1) the acute stroke unit of a general hospital, (2) an outpatient stroke prevention clinic, (3) a stroke rehabilitation unit in a specialized geriatric hospital, or (4) a stroke rehabilitation unit of a rehabilitation hospital. Patients meeting National Institute of Neurological and Communicative Disorders and Stroke (NINCDS) and World Health Organization Multinational Monitoring of Trends and Determinants in Cardiovascular Disease (WHO-MONICA) project criteria for stroke were invited to participate in this study within the first 5 to 31 days post stroke. Patients with subarachnoid or intracranial hemorrhage, decreased level of consciousness, severe aphasia or dysarthria, or a significant acute medical, neurological, or psychiatric illness were excluded. Clinical assessments included the Mini-Mental State Examination (MMSE) for cognition, the National Institutes of Health Stroke Scale (NIHSS) for stroke severity, and the Center for Epidemiological Studies Depression Scale (CES-D) for depressive symptoms. Enzyme-linked immunosorbent assay (ELISA) was used to measure serum concentrations of CRP, interleukin 6 (IL-6), and interferon gamma (IFN-gamma).

RESULTS:

A total of 48 patients with ischemic stroke (age [mean +/- SD] 71.6 +/- 13.2 years, 54.2% male, MMSE 26.4 +/- 3.8, NIHSS 6.8 +/- 4.0) were recruited within their first month post stroke. Backward stepwise elimination linear regression showed that higher concentrations of serum CRP (beta(CRP) = -0.46, p(CRP) = 0.002) predicted lower post stroke global cognition ([MMSE], F1,44 = 11.31, P = .002), with age (P = .92), level of education (P = .22), infarct side (P = 0.49), IL-6 (P = 0.36), and IFN-gamma (P = .57) removed from the final model.

CONCLUSIONS:

A post stroke inflammatory response may be important in subacute, PSCI.
The relationship between inflammatory markers and post stroke cognitive impairment.


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CONCLUSIONS: A post stroke inflammatory response may be important in subacute, PSCI.
ORIGINAl REPORT

PREDICTION OF DEPRESSIVE SYMPTOMS UP TO THREE YEARS POST-STROKE

Vera Schepers, MD, PhD, Marcel Post, PhD, Anne Visser-Meily, MD, PhD, Ingrid van de Port, PhD, Mimouna Akhmouch, MD and Eline Lindeman, MD, PhD

From the Center of Excellence for Rehabilitation Medicine Utrecht, Rehabilitation Center De Hoogstraat and Rudolf Magnus Institute of Neuroscience, University Medical Center Utrecht, Utrecht, The Netherlands.

Objective: To describe the long-term course of depressive symptoms up to 3 years post-stroke and to develop a prediction model for depressive symptoms 1 and 3 years post-stroke.

Design: Longitudinal follow-up study.

Patients: Data were analysed for 131 patients with a first-ever supratentorial stroke admitted for inpatient rehabilitation in the Netherlands.

Methods: The Center for Epidemiologic Studies-Depression scale was used to assess post-stroke depressive symptoms at 6 months, 1 and 3 years post-stroke.

Results: Post-stroke depressive symptoms were present 6 months, 1 year and 3 years post-stroke in 23.7%, 25.2% and 16.0% of the patients, respectively. At all 3 assessments post-stroke depressive symptoms were absent in 65.6% of the patients and present in 12.2% of the patients. Of the patients with post-stroke depressive symptoms 6 months post-stroke, 41.9% had recovered from post-stroke depressive symptoms 3 years post-stroke. The most important predictor of post-stroke depressive symptoms 1 and 3 years post-stroke was severity, assessment methods and study design (cross-sectional vs longitudinal). A systematic review (2) pooled data from observational studies published up to June 2004 and found that 33% of all patients after stroke experience significant depressive symptoms at some time after stroke onset. However, an evaluation of the individual course of post-stroke depression found much lower percentages: 2-17% of patients after stroke had persistent depressive symptoms throughout the first year post-stroke, and 50-80% of all patients after stroke with an early depression (between 0 and 3 months post-stroke) had recovered 1 year post-stroke (3-6).

There are only a few longitudinal studies (6-8) available describing the course of depression beyond 1 year post-stroke, and these have reported contradictory findings. A hospital-based study found a gradual decrease, from 43% at 6 months post-stroke to 18% at 3 years post-stroke (7). In contrast, another hospital-based study found a decrease from 31% to 16% in the first year and an increase during the second and third years, up to 29% (6). Likewise, a study in a rehabilita-
Conclusion: Long-term post-stroke depressive symptoms are highly predictable at 6 months post-stroke. If a patient has not recovered from post-stroke depressive symptoms within the first 6 months post-stroke there is a high risk of chronic post-stroke depressive symptoms.
Involvement of serotonin neurotransmission in hippocampal neurogenesis and behavioral responses in a rat model of post-stroke depression

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WAY-100,635

ABSTRACT

Ischemia-stimulated dentate gyrus (DG) neurogenesis is hypothesized to be an etiological factor of post-stroke depression. The current findings provide support for the hypothesis that serotonin 1A (5-HT1A) receptor antagonists and selective serotonin reuptake inhibitors (SSRIs) in PSD. Clinical investigations have explored the strategy of augmenting SSRIs action by combination with a 5-HT1A receptor antagonist. We investigated the relative importance of the effects on ischemia-stimulated neurogenesis and depressive-like behavior of WAY-100635 versus citalopram at different dose levels in PSD animals. Adult rats were exposed to a chronic mild stress paradigm after ischemic surgery. Decreased sucrose consumption was indicative of the core depressive syndrome anhedonia. Proliferating cells and their fate were monitored by bromodeoxyuridine labeling protocols up to 28 days after ischemia. Expression of the 5-HT1A receptor in DG was also examined. The current findings confirmed the ability of WAY-100635 to augment SSRIs pharmacological efficacy and SSRIs-induced elevation of post-stroke DG neurogenesis. Specifically, WAY-100635 and citalopram in different dose combinations display their relative importance in ischemia-stimulated neurogenesis probably through reinforcing serotonergic neurotransmission and/or density of 5-HT1A receptor in DG. The present data extend our understanding that increase of ischemia-induced DG neurogenesis can be interpreted as a valid index, to an extent, or even a prerequisite for an efficient co-treatment strategy.
Neurogenesis

- provides another explanation for the “therapeutic lag” observed for SSRIs.
- Jacobs (2002) has suggested that this lag is due to the time it takes for newly formed cells to migrate and form neurons that are fully and functionally integrated into the existing brain circuitry.
• Identified a decrease in 5-HT1A mRNA levels in hippocampus in chronically stressed post-stroke rats indicating biological mechanism, according to which ischemic insults directly affect neural circuits including serotonin system involved in mood regulation after stroke.
• PSD appears instead to be multifactorial in origin and consistent with the biopsychosocial model of mental illness, rather than “pure” psychosocial mechanism
Music listening enhances cognitive recovery and mood after middle cerebral artery stroke

Teppo Särkämö,1 Mari Tervaniemi,1 Sari Laitinen,2 Anita Forsblom,2 Seppo Soinila,3 Mikko Mikkonen,1 Taina Autti,4 Heli M. Silvennoinen,4 Jaakko Erkkilä,2 Matti Laine,5 Isabelle Peretz6 and Marja Hietanen3

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E-mail: teppo.sarkamo@helsinki.fi

We know from animal studies that a stimulating and enriched environment can enhance recovery after stroke, but little is known about the effects of an enriched sound environment on recovery from neural damage in humans. In humans, music listening activates a wide-spread bilateral network of brain regions related to attention, semantic processing, memory, motor functions, and emotional processing. Music exposure also enhances emotional and cognitive functioning in healthy subjects and in various clinical patient groups. The potential role of music in neurological rehabilitation, however, has not been systematically investigated. This single-blind, randomized, and controlled trial was designed to determine whether everyday music listening can facilitate the recovery of cognitive functions and mood after stroke. In the acute recovery phase, 60 patients with a left or right hemisphere middle cerebral artery (MCA) stroke were randomly assigned to a music group, a language
Changes in the 10 cognitive domains (mean SEM) from the baseline (BL; 1-week post-stroke stage) to the 3-month (3 m) and the 6-month (6 m) post-stroke stage (baseline score subtracted from the values) in the three patient groups. **P < 0.01, *P < 0.05 by mixed-model ANOVA.

Särkämö T et al. Brain 2008;131:866-876
Effect of antidepressants on the course of disability following stroke.

Mikami K, Jorge RE, Adams HP, Davis PH, Leira EC, Jang M, Robinson RG.

OBJECTIVE:
Stroke often produces marked physical and cognitive impairments leading to functional dependence, caregiver burden, and poor quality of life. We examined the course of disability during a 1-year follow-up period after stroke among patients who were administered antidepressants for 3 months compared to patients given placebo for 3 months.

METHODS:
A total of 83 patients entered a double-blind randomized study of the efficacy of antidepressants to treat depressive disorders and reduce disability after stroke. Patients were assigned to either fluoxetine (N = 32), nortriptyline (N = 22) or placebo (N = 29). Psychiatric assessment included administration of the Present State Examination modified to identify DSM-IV symptoms of depression. The severity of depression was measured using the 17-item Hamilton Depression Rating Scale. The modified Rankin Scale was used to evaluate the disability of patients at initial evaluation and at quarterly follow-up visits for 1 year. Impairment in activities of daily living was assessed by Functional Independence Measure at the same time.

RESULTS:
During the 1-year follow-up period, and after adjusting for critical confounders including age, intensity of rehabilitation therapy, baseline stroke severity, and baseline Hamilton Depression Rating Scale, patients who received fluoxetine or nortriptyline had significantly greater improvement in modified Rankin Scale scores compared to patients who received placebo (t [156] = -3.17, p = 0.002).

CONCLUSIONS:
Patients treated with antidepressants had better recovery from disability by 1-year post stroke (i.e., 9 months after antidepressants were stopped) than patients who did not receive antidepressant therapy. This effect was independent of depression suggesting that antidepressants may facilitate the neural mechanisms of recovery in patients with stroke.
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[Incidence rate and acupuncture-moxibustion treatment of post-stroke depression]

Liu SK, Zhao XM, Xi ZM.

The First Central Hospital of Baoding City, Hebei 071000, China.

OBJECTIVE: To understand the incidence of post-stroke depression (PSD) and the therapeutic effect of acupuncture-moxibustion. METHODS: Five hundred and sixty cases were rating with Hamilton depression scale, and lesion parts, gender, age and property of stroke between the PSD and non-PSD were compared by analysis of variance, chi2 test, and then the patients of PSD were randomly divided into two groups and treated respectively with Prozac-20 and acup-moxibustion. RESULTS: The total incidence rate of PSD was 43.9%, with no relation to the lesion parts, gender, age and property of stroke (P > 0.05), and there were very significant differences in HAMD scores before and after treatment in the two groups (P < 0.0001), with no significant difference in the effective rate between the two groups (P > 0.05). CONCLUSION: PSD has a high incidence and influences the recovery of nervous function, and it should be treated at early stage.

**Acup-moxibustion and Prozac 20mg have similar therapeutic effect.**
Post Stroke Depression

- Treatment:

- Four placebo controlled randomized double blind studies: ’79, ’84, ’86 and 2000

- Nortriptyline, Trazadone, Citalopram and Fluoxetine vs. Nortriptyline vs. placebo

- All efficacious.

- Nortriptyline greater reduction in HAM-D scores than Fluoxetine or placebo but more side effects.

- ECT: effective and safe and less side effects in PSD.
OBJECTIVES:
To review the best current evidence on heterocyclic and serotonin-reuptake inhibitor (SSRI) treatments of post stroke depression (PSD).

DESIGN:
A literature review using multiple databases was conducted to identify randomized, controlled trials of the treatment or prevention of PSD. Odds ratios were used to test for significant treatment response between the treatment arms for dichotomous outcomes. Continuous outcome measures were evaluated using weighted mean difference and 95% confidence intervals.

SETTING:
Literature review.

PARTICIPANTS:
Patients with stroke enrolled in the study of PSD of each selected article.

MEASUREMENTS:
Frequency of patients with and without depression; frequency of patients who responded to treatment.

RESULTS:
Nine articles were reviewed. Six investigated use of antidepressant therapy on treatment of PSD, and three examined the prevention of PSD. There was evidence to suggest that patients responded to treatment with antidepressants and significantly improved on depression scales, but treatment, especially with heterocyclic antidepressants, led to a significant number of dropouts due to side effects. There were insufficient data to pool the results of the prevention-based studies.

CONCLUSION:
Treatment with heterocyclic antidepressants and SSRIs appears to be a viable option for PSD, but their absolute or relative efficacy has yet to be fully established. The effectiveness of early initiation of antidepressants in the prevention of PSD is not clear.
Heterocyclics and selective serotonin reuptake inhibitors in the treatment and prevention of poststroke depression.

Bhogal SK, Teasell R, Foley N, Speechley M.

Source
Department of Physical Medicine and Rehabilitation, St. Joseph’s Health Care London, Parkwood Hospital, London, Ontario, Canada.

Abstract

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Suicide in Patients With Stroke: A Population-Based Study of Suicide Victims During the Years 1988-2007 in Northern Finland

Eva Forssström, B.M.
Helinä Hakko, Ph.D.
Tanja Nordström, B.Sc.
Pirkko Räsänen, M.D., Ph.D.
Arja Mainio, M.D., Ph.D.

Depression is the most common psychiatric complication after stroke. On the other hand, it has been found that patients with depression have an elevated risk for stroke. The prevalence of poststroke depression at 1 month after stroke up to 6 years after stroke has varied from 12% to 60% as largely reviewed by Hackett et al. as well as Paolucci. Risk factors for poststroke depression include: female gender, age younger than 65 years, living alone, having had a recurrent stroke, being dependent on others, and institutional living 5 months after stroke.

It is well-known that depression is highly associated with suicide. Furthermore, suicidal thoughts after stroke are common; in a follow-up study of 300 patients, up to 11% had suicidal plans during the 2 years following their stroke. A Danish study found that the risk of suicide is strongly increased after stroke, particularly among patients younger than 60 years old and among females. The risk seems to be greatest within the first 5 years after stroke.

The impact of poststroke depression on poorer outcomes among stroke patients is well known.
A Population-Based Study of Suicide Victims During the Years 1988-2007 in Northern Finland

### TABLE 1. Characteristics of Suicide Victims With and Without a Stroke

<table>
<thead>
<tr>
<th></th>
<th>Suicide Victims With Stroke</th>
<th>Suicide Victims Without Stroke</th>
<th>Group Difference</th>
<th>Pairwise Difference</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>(n = 75)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sociodemographics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>58 (77.3)</td>
<td>1434 (83.0)</td>
<td>0.011</td>
<td>0.994</td>
</tr>
<tr>
<td>Females</td>
<td>17 (22.7)</td>
<td>297 (17.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age in years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>61.4 (15.8)</td>
<td>36.3 (10.5)</td>
<td>&lt;0.001</td>
<td>0.056</td>
</tr>
<tr>
<td>Females</td>
<td>63.2 (12.5)</td>
<td>38.2 (11.1)</td>
<td>&lt;0.001</td>
<td>0.948</td>
</tr>
<tr>
<td>Gender difference***</td>
<td>p=0.660</td>
<td>p=0.008</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suicide Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suicide method</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hanging</td>
<td>28 (37.3)</td>
<td>453 (26.2)</td>
<td>&lt;0.001</td>
<td>0.148</td>
</tr>
<tr>
<td>Shooting</td>
<td>19 (25.3)</td>
<td>533 (30.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poisoning</td>
<td>16 (21.3)</td>
<td>333 (19.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas</td>
<td>1 (1.3)</td>
<td>130 (7.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic</td>
<td>0 (0)</td>
<td>83 (4.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jumping from a high place</td>
<td>4 (5.3)</td>
<td>44 (2.5)</td>
<td></td>
<td></td>
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<tr>
<td>Drowning</td>
<td>6 (8.0)</td>
<td>105 (6.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1 (1.3)</td>
<td>47 (2.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violent suicide method</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>58 (77.3)</td>
<td>1265 (73.2)</td>
<td>0.015</td>
<td>0.655</td>
</tr>
<tr>
<td>Yes</td>
<td>17 (22.7)</td>
<td>463 (26.8)</td>
<td></td>
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</tr>
<tr>
<td>Previous suicide attempts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>67 (89.3)</td>
<td>1545 (89.4)</td>
<td>0.918</td>
<td>0.881</td>
</tr>
<tr>
<td>Yes</td>
<td>8 (10.7)</td>
<td>183 (10.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suicide under the influence of alcohol</td>
<td></td>
<td>872 (50.5)</td>
<td>&lt;0.001</td>
<td>0.171</td>
</tr>
<tr>
<td>No</td>
<td>60 (80.0)</td>
<td>856 (49.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>15 (20.0)</td>
<td>348 (72.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical Characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital-treated psychiatric disorder</td>
<td></td>
<td>991 (57.3)</td>
<td>0.015</td>
<td>0.308</td>
</tr>
<tr>
<td>No</td>
<td>34 (45.3)</td>
<td>248 (51.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>41 (54.7)</td>
<td>737 (42.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital-treated depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>51 (68.0)</td>
<td>1440 (83.3)</td>
<td>&lt;0.001</td>
<td>0.644</td>
</tr>
<tr>
<td>Yes</td>
<td>24 (32.0)</td>
<td>288 (16.7)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Group difference between victims with stroke, victims <55 years old without stroke, and victims ≥55 years old without stroke. Pearson’s chi-square test, df=2, two tailed significance.

**Pairwise difference between victims with a stroke and victims ≥55 years old without a stroke. Pearson’s chi-square test, df=1, two-tailed significance.

***Difference between genders. Student’s t-test, two-tailed significance.
From: Suicide in Patients With Stroke: A Population-Based Study of Suicide Victims During the Years 1988-2007 in Northern Finland

Fatigue among stroke patients on long-term follow-up. The Bergen Stroke Study.

Naess H, Lunde L, Brogger J, Waje-Andreassen U.

Source
Department of Neurology, Haukeland University Hospital, Bergen, Norway.

To evaluate characteristics and mortality related to post-stroke fatigue (PSF).

METHODS:
All surviving stroke patients admitted to the Stroke Unit, Haukeland University Hospital, between February 2006 and November 2008 were sent a postal questionnaire including the Fatigue Severity Scale (FSS), the hospital anxiety and depression scale (HADSD), and the Barthel Index (BI) at least 6 months after stroke onset. Survival among patients returning the questionnaire was determined by November 2009. PSF was defined as FSS score ≥5.

RESULTS:
Among 377 patients returning the questionnaire, 42.3% had PSF. Logistic regression showed that PSF was independently associated with pre-stroke depression, leucoaraiosis, myocardial infarction, diabetes mellitus, pain, and sleeping disturbances. Mean FSS score was lower among TIA patients than among patients with minor cerebral infarction (patients with BI=100) (P=.002). Cox regression analysis showed mortality to be associated with PSF.

CONCLUSION:
There is a multifactorial basis for PSF suggesting different therapy options. Cerebral lesions may cause PSF in some patients. Post-stroke fatigue is associated with higher mortality.
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MANIA
MANIA

- Elevated, irritable or expansive mood.
- At least 1 week. Less, if hospitalization needed.
- Inflated self esteem.
- Decreased need for sleep.
- Pressure of speech/thought.
- Poor attention.
- Increase in pleasure seeking activity.
- Agitation or increased goal directed activity.
- Impairment in general level of function.
HYPOMANIA

- Elevated, expansive or irritable mood.
- At least 4 days.
- Same symptoms and signs as mania but not as severe.
- Does NOT cause impairment in general functioning. Hospitalization is not needed.
- Change in functioning is observable by others.
Post Stroke Mania

- Rare.
- Phenomenology is the same as “primary” mania.
- Location: Right side: Orbitofrontal cortex, basal temporal cortex, caudate, thalamus.

Starkstein, Robinson
Post Stroke Mania

Risk factors:

- Family history of mood disorders.
- Subcortical atrophy.
Mania and Stroke: A Systematic Review

Catarina O. Santos\textsuperscript{a}  Lara Caeiro\textsuperscript{a}  José M. Ferro\textsuperscript{b}  M. Luísa Figueira\textsuperscript{c}

\textsuperscript{a}Institute of Molecular Medicine, Faculty of Medicine, University of Lisbon, \textsuperscript{b}Stroke Unit, Neurology Service and \textsuperscript{c}Psychiatry Service, Department of Neurosciences, Hospital de Santa Maria, Faculty of Medicine, University of Lisbon, Lisbon, Portugal
Conclusions

- This systematic review confirms the rarity of post-stroke mania because in about 50 years we found only 74 reported cases of adult stroke patients with mania symptoms.

- It found a typical patient to be male, without a personal/family history of psychiatric disorder, with at least one vascular risk factor, without subcortical atrophy and with a right cerebral infarct.
Post Stroke Mania

Treatment:

• No systematic studies.

• Same treatment as primary mania: Anticonvulsants: Valproate and Carbamazepine.

• Atypical neuroleptics and lithium.
Generalized Anxiety Disorder (GAD)

- Chronic, excessive, uncontrollable worry
  - At least 6 months’ duration
  - More days with symptoms than not
  - Associated with fatigue, insomnia, muscle tension, poor concentration, and irritability
- One year prevalence: 2% – 5%
- Symptoms of GAD wax and wane over time, but rarely remit fully without treatment


Martin B. Keller, MD
October 2004
Post stroke Anxiety

- Generalized Anxiety Disorder often co-morbid with Post Stroke Depression.
- Significantly higher frequency of cortical lesions compared to PSD-only patients.
- Aphasia commonly associated with anxiety GAD and panic attacks.
- Social phobia?
- OCD, PTSD?

Shimoda, Robinson, Astrom, Kimura
Conclusions

- First line agents: SSRIs, SNRIs, and benzodiazepines
- Individualized drug selection: eg, comorbidity
- Watch for early aggravation of symptoms
- Monotherapy not always sufficient
- CBT and medications can be combined
- Treat to remission
- Treat long term
The relationship between inflammatory markers and post stroke cognitive impairment.

To determine whether there is a relationship between inflammatory markers (serum C-reactive protein (CRP) and cytokines) and post stroke cognitive impairment (PSCI). Methods: This was a cross-sectional observational study. Patients were recruited from 4 sources: (1) the acute stroke unit of a general hospital, (2) an outpatient stroke prevention clinic, (3) a stroke rehabilitation unit in a specialized geriatric hospital, or (4) a stroke rehabilitation unit of a rehabilitation hospital. Patients meeting National Institute of Neurological and Communicative Disorders and Stroke (NINCDS) and World Health Organization Multinational Monitoring of Trends and Determinants in Cardiovascular Disease (WHO-MONICA) project criteria for stroke were invited to participate in this study within the first 5 to 31 days post stroke. Patients with subarachnoid or intracranial hemorrhage, decreased level of consciousness, severe aphasia or dysarthria, or a significant acute medical, neurological, or psychiatric illness were excluded. Clinical assessments included the Mini-Mental State Examination (MMSE) for cognition, the National Institutes of Health Stroke Scale (NIHSS) for stroke severity, and the Center for Epidemiological Studies-Depression Scale (CES-D) for depressive symptoms. Enzyme-linked immunosorbent assay (ELISA) was used to measure serum concentrations of CRP, interleukin 6 (IL-6), and interferon gamma (IFN-gamma).

RESULTS:
A total of 48 patients with ischemic stroke (age [mean +/- SD] 71.6 +/- 13.2 years, 54.2% male, MMSE 26.4 +/- 3.8, NIHSS 6.8 +/- 4.0) were recruited within their first month post stroke. Backward stepwise elimination linear regression showed that higher concentrations of serum CRP (beta(CRP) = -0.46, p(CRP) = 0.002) predicted lower post stroke global cognition ([MMSE], F1,44 = 11.31, P = .002), with age (P = .92), level of education (P = .22), infarct side (P = 0.49), IL-6 (P = 0.36), and IFN-gamma (P = .57) removed from the final model.

CONCLUSIONS:
A post stroke inflammatory response may be important in subacute, PSCI.
Pathological Laughter and Crying

- Uncontrollable crying and or laughter without a discernible stressor.
- No correlation with depression or mania.
Pathological laughter and crying

The basis pontis stands out as the only site where a single discrete lesion can cause PLC.

- Other anatomical sites that are often associated with PLC are bilateral internal capsule, bilateral cerebral peduncles, and the cerebellum.
Neurological Causes

- Amyotrophic lateral sclerosis 49%
- Cerebellar type of multiple system atrophy 36%
- Cerebellopontine tumors 30%
- **Stroke 11-34%**
- Multiple sclerosis 10%
- Traumatic Brain Injury 6-12%
- Dementia: types?
- Other (single) cases
PSYCHOSIS
Post stroke psychosis

- Very rare.
- Anecdotal or small number series (5).
- Right hemisphere.
- Frontoparietal lesions.
- Greater subcortical atrophy compared to non psychotic CVA.
Frontal Syndromes
The little neuro-anatomist in me
Orbitofrontal Syndrome

- “Behavioural excess”
- Impulsivity.
- Hyperactivity.
- Lability.
- Psychomotor hyperactivity.
- Aggression.
Dorsolateral Frontal Syndrome

- “Slow” syndrome.
- Inattentive. Poor judgment.
- Perseveration.
- Psychomotor retardation.
- Passivity.
- Blunt affect.
- Disorganized. Rigid. Concrete.
Ventro-Medial Frontal Syndrome

- Apathy.
- Poor initiation.
- Poor follow through.
Frontal Lobe Syndromes

- **Dorsolateral** → **Dysexecutive**.
- **Ventromedial** → **Apathetic/abulic**.
- **Orbitofrontal** → **Impulsive/aggressive**.
Behavioural Changes After Stroke

Neglect Syndrome.
Neglect Syndrome

- Right hemisphere directs attention into the left hemispace and environment.
- Left hemisphere directs attention mostly to the right half of space.
- Damage to the right hemisphere = deficit in attention to left visual space.
Neglect Syndrome

- NEGLECT: inability to respond or acknowledge the LEFT hemi-space.

- Can also occur infrequently in right hemi-space.
Neglect syndrome

- We ALL “neglect” information to some degree.
FINISHED FILES ARE THE RESULT OF YEARS OF SCIENTIFIC STUDY COMBINED WITH THE EXPERIENCE OF YEARS
FINISHED FILES ARE THE RESULT OF YEARS OF SCIENTIFIC STUDY COMBINED WITH THE EXPERIENCE OF YEARS.
Left hemisphere: sees lines.

Right hemisphere: sees a dog.
Behavioural Changes After Stroke

Anosognosia
Anosognosia

- Lack of awareness of abnormal or deficient functions.
- Significantly associated with neglect syndrome and lack of ability in recognizing facial emotion and emotional content of speech (prosody).
- Not related to sensory deficits.
- Present in 1/3 of acute ABI patients.
Anosognosia

- RIGHT sided lesions.
- Frontal dysfunction.
- Parietal and basal ganglia regions.
- Temporal lobe.
Anosognosia.

- Very difficult to treat.
- Behavioural interventions, occupational therapy, physiotherapy, speech therapy and recreational therapy.
- Depending on the cause, medications might help with the behaviour it produces.
- Often, it does not respond to medications.
Apathy is at an all-time high.
Behavioural Changes After Stroke

Apathy Syndrome.
Apathy

• Absence or lack of feeling, emotion, interest or concern.
• Rates vary: 11% of ABI patients. Another 11% had both apathy and depression.
• Apathetic patients seem to be significantly older, than non-apathetic patients.
• More deficits in activities of daily living.

Starkstein '93
• Lesions in the basal ganglia: posterior limb of internal capsule.

• Medial frontal lobe areas.
Apathy Syndrome

• Rule out sensorial deficits (visual, auditory, etc.).
• Age, cultural expectations, family involvement.
• Personality disorders, medications, general illnesses, etc.
Apathy Syndrome

• Needs to be distinguished from depression.
• Depression and apathy can coexist.
• Treatment includes stimulants like methylphenidate, modafinil, amantadine and others. Hypertension and tachycardia are concerns.
• Behavioural modification is part of the treatment. Caregivers need to be involved.
• Difficult to treat in severe cases.
Behavioural Changes After Stroke

Anger and Aggression.
Anger and Aggression.

- Third leading concern to caregivers, after depression and memory dysfunction.
- Verbal aggression, physical violence, oppositional behaviour, non-compliance with treatment or care etc.
- Chronic or episodic.
Anger and Aggression.

- Communication disorders, dementia, delirium.
- Depression, anxiety, psychosis, adjustment disorders, pre stroke personality, social and financial stressors etc.
- Pain, constipation, infections, skin lesions etc.
- Catastrophic reaction.
Management

• C.V.A. patients have “old brains”
• Extra Pyramidal Syndr. more common in neuro patients.
• APHASIA
• Dysarthria, dysphagia, ataxia, urinary incontinence, seizures, SIADH etc.
• Anticholinergic side effects in memory dysfunction.
• Paradoxical reactions.
Management

• First choice in non acute aggression:
  non pharmacological:
  Environmental changes.
  Behavioural modification.
  Education of caregivers.
  Rule out other “organic” problems.
Management

- In non-acute aggression:
- SSRI low dose* T.C.A’s* Trazadone*
- Beta blocker: pindolol (5-10 mg) vs. propranolol (20-60mg)*
- Anticonvulsants: Carbamazepine (200-600 mg), Valproate (250-750mg) Lamotrigine (25-100mg).

* Baseline and follow-up ECG recommended
Management: acute aggression

- Benzodiazepines: avoid long acting.
- Lorazepam: 0.5-4mg/d.
- Clonazepam: 0.25-2mg/d.
- I dislike high potency-short acting agents due to rebound effect and paradoxical agitation in C.V.A.: i.e. alprazolam.
Management

- **Neuroleptics: daily doses**
- **Atypical:** Risperidone (0.5-4mg) Olanzapine (2.5-10mg) Quetiapine (25-400mg).
- **Clozapine:** 12.5-200mg. Seizures, poor compliance with weekly testing.
- **Typical:** Haloperidol: 0.25-5mg.
Management

- Lithium: risk of Diabetes Insipidus, worsening of ataxia, pseudotumour cerebri, tremor, narrow therapeutic window in cognitively impaired patients, etc.
- 300mg-900mg/d.
- Limit it’s use to aggression secondary to mania.
Rx:

1- LORAZEPAM:
0.5 MG SL/PO/IM PRN AGITATION.
MAY REPEAT IN 45 MINUTES.
MAX: 4 DOSES IN A 24 HR. PERIOD.

2- HALDOL:
0.5 MG PO/IM, PRN VIOLENT BEHAVIOUR.
MAY REPEAT IN 45 MIN. MAX: 2 DOSES IN A 24 HR. PERIOD.
Remember Mr. M.?

• “I still have music in my head, I can hear it, but it can’t be written”.

• Was often intermittently confused.

• While swimming he lost the capacity to move the right side of his body. Was rescued and taken to the hospital.

• Diagnosed with a stroke and aphasia.
Mr. M.

- After his stroke and aphasia:
- Sank into a depressive state.
- Over time cognitive function worsened.
- Exploratory procedure discovered an “atrophied left hemisphere”
- Comatose.
- Died 2 days later. No autopsy.

Who was he?
Place of Birth
Mr. M.
Age 6
Age 45
Ravel’s Home
Maurice Ravel

• Long history of depression with insomnia.
• Might have had tuberculosis at some point.
• Suffered a transient ischemic attack several times at age 57.
• Had a stroke at age 58. Became partially aphasic (expressive).
• Craniotomy was performed as a last resort in 1937. He died 48 hrs. later.
“I have written only one masterpiece: the *Bolero*. Unfortunately it contains no music!”
“It was nice nonetheless…and I had so much music in me.

Now…it’s finished.”

“C’était beau, tout de meme. Et puis, J’avais encore tant de musique dans maintenant, c’est fini pour moi”
Maurice Ravel 1875-1937
Thank you for your attention.