MINIREVIEWS

4688  Relationship between non-alcoholic fatty liver disease and coronary heart disease
       Arslan U, Yenerçag M

ORIGINAL ARTICLE

Retrospective Cohort Study

4700  Remission of hepatotoxicity in chronic pulmonary aspergillosis patients after lowering trough concentration of voriconazole
       Teng GJ, Bai XR, Zhang L, Liu HJ, Nie XH

Retrospective Study

4708  Endoscopic submucosal dissection as alternative to surgery for complicated gastric heterotopic pancreas
       Noh JH, Kim DH, Kim SW, Park YS, Na HK, Ahn JY, Jung KW, Lee JH, Choi KD, Song HJ, Lee GH, Jung HY

4719  Observation of the effects of three methods for reducing perineal swelling in children with developmental hip dislocation

4726  Predictive value of serum cystatin C for risk of mortality in severe and critically ill patients with COVID-19
       Li Y, Yang S, Peng D, Zhu HM, Li BY, Yang X, Sun XL, Zhang M

4735  Sleep quality of patients with postoperative glioma at home
       Huang Y, Jiang ZJ, Deng J, Qi YJ

4743  Early complications of preoperative external traction fixation in the staged treatment of tibial fractures: A series of 402 cases
       Yang JZ, Zhu WB, Li LB, Dong QR

4753  Retroperitoneal vs transperitoneal laparoscopic lithotripsy of 20-40 mm renal stones within horseshoe kidneys

4763  Undifferentiated embryonal sarcoma of the liver: Clinical characteristics and outcomes
       Zhang C, Jia CJ, Xu C, Sheng QJ, Dou XG, Ding Y

4773  Cerebral infarct secondary to traumatic internal carotid artery dissection
       Wang GM, Xue H, Guo ZJ, Yu JL

4785  Home-based nursing for improvement of quality of life and depression in patients with postpartum depression
       Zhuang CY, Lin SY, Cheng CJ, Chen XJ, Shi HL, Sun H, Zhang HY, Fu MA
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>4793</td>
<td>Cost-effectiveness of lutetium ($^{177}$Lu) oxodotreotide vs everolimus in gastroenteropancreatic neuroendocrine tumors in Norway and Sweden</td>
<td>Palmer J, Leeuwenkamp OR</td>
</tr>
<tr>
<td>4826</td>
<td>Underwater vs conventional endoscopic mucosal resection in treatment of colorectal polyps: A meta-analysis</td>
<td>Ni DQ, Lu YP, Liu XQ, Gao LY, Huang X</td>
</tr>
<tr>
<td>4844</td>
<td>Intracranial malignant solitary fibrous tumor metastasized to the chest wall: A case report and review of literature</td>
<td>Usuda D, Yamada S, Izumida T, Sangen R, Higashikawa T, Nakagawa K, Iguchi M, Kasamaki Y</td>
</tr>
<tr>
<td>4853</td>
<td>End-of-life home care of an interstitial pneumonia patient supported by high-flow nasal cannula therapy: A case report</td>
<td>Goda K, Kenzaka T, Kuriyama K, Hoshijima M, Akita H</td>
</tr>
<tr>
<td>4858</td>
<td>Rupture of carotid artery pseudoaneurysm in the modern era of definitive chemoradiation for head and neck cancer: Two case reports</td>
<td>Kim M, Hong JH, Park SK, Kim SJ, Lee JH, Byun J, Ko YH</td>
</tr>
<tr>
<td>4876</td>
<td>Paliperidone palmitate-induced facial angioedema: A case report</td>
<td>Srituengfung M, Sukakul T, Liangcheep C, Viravan N</td>
</tr>
<tr>
<td>4883</td>
<td>Improvement of lenvatinib-induced nephrotic syndrome after adaptation to sorafenib in thyroid cancer: A case report</td>
<td>Yang CH, Chen KT, Lin YS, Hsu CY, Ou YC, Tung MC</td>
</tr>
<tr>
<td>4895</td>
<td>Adult metaplastic hutch diverticulum with robotic-assisted diverticulectomy and reconstruction: A case report</td>
<td>Yang CH, Lin YS, Ou YC, Weng WC, Huang LH, Lu CH, Hsu CY, Tung MC</td>
</tr>
</tbody>
</table>
Contents

Semimonthly Volume 8 Number 20 October 26, 2020

4902 Thrombus straddling a patent foramen ovale and pulmonary embolism: A case report
Huang YX, Chen Y, Cao Y, Qiu YG, Zheng JY, Li TC

4908 Therapeutic experience of an 89-year-old high-risk patient with incarcerated cholecystolithiasis: A case report and literature review

4917 Woven coronary artery: A case report
Wei W, Zhang Q, Gao LM

4922 Idiopathic multicentric Castleman disease with pulmonary and cutaneous lesions treated with tocilizumab: A case report
Han PY, Chi HH, Su YT

4930 Perianorectal abscesses and fistula due to ingested jujube pit in infant: Two case reports
Liu YH, Lv ZB, Liu JB, Sheng QF

4938 Forniceal deep brain stimulation in severe Alzheimer’s disease: A case report

4946 Systemic autoimmune abnormalities complicated by cytomegalovirus-induced hemophagocytic lymphohistiocytosis: A case report
Miao SX, Wu ZQ, Xu HG

4953 Nasal mucosa pyoderma vegetans associated with ulcerative colitis: A case report
Yu SX, Cheng XK, Li B, Hao JH

4958 Amiodarone-induced hepatotoxicity — quantitative measurement of iodine density in the liver using dual-energy computed tomography: Three case reports
Lv HJ, Zhao HW

4966 Multisystem involvement Langerhans cell histiocytosis in an adult: A case report
Wang BB, Ye JR, Li YL, Jin Y, Chen ZW, Li JM, Li YP

4975 New mutation in EPCAM for congenital tufting enteropathy: A case report
Zhou YQ, Wu GS, Kong YM, Zhang XY, Wang CL

4981 Catastrophic vertebral artery and subclavian artery pseudoaneurysms caused by a fishbone: A case report
Huang W, Zhang GQ, Wu JJ, Li B, Han SG, Chao M, Jin K

4986 Anastomosing hemangioma arising from the left renal vein: A case report

4993 Bladder perforation caused by long-term catheterization misdiagnosed as digestive tract perforation: A case report
Wu B, Wang J, Chen XJ, Zhou ZC, Zha MY, Shen YY, Zhong ZX
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>5013</td>
<td>Massive gastrointestinal bleeding caused by a Dieulafoy’s lesion in a duodenal diverticulum: A case report</td>
<td>He ZW, Zhong L, Xu H, Shi H, Wang YM, Liu XC</td>
</tr>
<tr>
<td>5019</td>
<td>Plastic bronchitis associated with Botrytis cinerea infection in a child: A case report</td>
<td>Liu YR, Ai T</td>
</tr>
<tr>
<td>5025</td>
<td>Chest, pericardium, abdomen, and thigh penetrating injury by a steel rebar: A case report</td>
<td>Yang XW, Wang WT</td>
</tr>
<tr>
<td>5030</td>
<td>Monocular posterior scleritis presenting as acute conjunctivitis: A case report</td>
<td>Li YZ, Qin XH, Lu JM, Wang YP</td>
</tr>
<tr>
<td>5036</td>
<td>Choriocarcinoma with lumbar muscle metastases: A case report</td>
<td>Pang L, Ma XX</td>
</tr>
<tr>
<td>5042</td>
<td>Primary chondrosarcoma of the liver: A case report</td>
<td>Liu ZY, Jin XM, Yan GH, Jia SY</td>
</tr>
<tr>
<td>5057</td>
<td>Rare imaging findings of hypersensitivity pneumonitis: A case report</td>
<td>Wang HJ, Chen XJ, Fan LX, Qi QL, Chen QZ</td>
</tr>
<tr>
<td>5062</td>
<td>Effective administration of cranial drilling therapy in the treatment of fourth degree temporal, facial and upper limb burns at high altitude: A case report</td>
<td>Shen CM, Li Y, Liu Z, Qi YZ</td>
</tr>
</tbody>
</table>
ABOUT COVER

Peer-reviewer of World Journal of Clinical Cases, Dr. Aleem Ahmed Khan is a Distinguished Scientist and Head of The Central Laboratory for Stem Cell Research and Translational Medicine, Centre for Liver Research and Diagnostics, Deccan College of Medical Sciences, Kanchanbagh, Hyderabad (India). Dr. Aleem completed his Doctorate from Osmania University, Hyderabad in 1998 and has since performed pioneering work in the treatment of acute liver failure and decompensated cirrhosis using hepatic stem cell transplantation. During his extensive research career he supervised 10 PhD students and published > 150 research articles, 7 book chapters, and 2 patents. His ongoing research involves developing innovative technologies for organ regeneration and management of advanced cancers. (L-Editor: Filipodia)

AIMS AND SCOPE

The primary aim of World Journal of Clinical Cases (WJCC, World J Clin Cases) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

INDEXING/ABSTRACTING

The WJCC is now indexed in Science Citation Index Expanded (also known as SciSearch®), Journal Citation Reports/Science Edition, PubMed, and Pubmed Central. The 2020 Edition of Journal Citation Reports® cites the 2019 impact factor (IF) for WJCC as 1.013; IF without journal self cites: 0.991; Ranking: 120 among 165 journals in medicine, general and internal; and Quartile category: Q3.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: Ji-Hong Liu; Production Department Director: Xiang Li; Editorial Office Director: Jin-Lei Wang.

NAME OF JOURNAL

World Journal of Clinical Cases

ISSN

ISSN 2307-8960 (online)

LAUNCH DATE

April 16, 2013

FREQUENCY

Semimonthly

EDITORS-IN-CHIEF

Dennis A Bloomfield, Sandro Vento, Bao-Gan Peng

EDITORIAL BOARD MEMBERS

https://www.wjgnet.com/2307-8960/editorialboard.htm

PUBLICATION DATE

October 26, 2020

COPYRIGHT

© 2020 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

https://www.wjgnet.com/bpg/gerinfo/204

GUIDELINES FOR ETHICS DOCUMENTS

https://www.wjgnet.com/bpg/GerInfo/287

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

https://www.wjgnet.com/bpg/gerinfo/240

PUBLICATION ETHICS

https://www.wjgnet.com/bpg/GerInfo/288

PUBLICATION MISCONDUCT

https://www.wjgnet.com/bpg/gerinfo/208

ARTICLE PROCESSING CHARGE

https://www.wjgnet.com/bpg/gerinfo/242

STEPS FOR SUBMITTING MANUSCRIPTS

https://www.wjgnet.com/bpg/gerinfo/239

ONLINE SUBMISSION

https://www.f6publishing.com
Forniceal deep brain stimulation in severe Alzheimer's disease: A case report

Wei Lin, Wei-Qi Bao, Jing-Jie Ge, Li-Kun Yang, Zhi-Pei Ling, Xin Xu, Jie-Hui Jiang, Chuan-Tao Zuo, Yu-Hai Wang

ORCID number: Wei Lin 0000-0003-2332-924X; Wei-Qi Bao 0000-0002-6756-3639; Jing-Jie Ge 0000-0001-6413-5914; Li-Kun Yang 0000-0003-2074-9468; Zhi-Pei Ling 0000-0002-9547-0288; Xin Xu 0000-0002-6196-2997; Jie-Hui Jiang 0000-0003-4948-3683; Chuan-Tao Zuo 0000-0002-8856-7217; Yu-Hai Wang 0000-0002-2604-8235.

Author contributions: Lin W drafted the manuscript, conducted the deep brain stimulation (DBS) surgery, analyzed the neuropsychological data, and designed the study; Bao WQ, Ge JJ, and Jiang JH drafted the manuscript, acquired and analyzed the PET data, and designed the study; Yang LK, Ling ZP, and Xu X revised the manuscript, conducted DBS surgery, analyzed neuropsychological data, and designed the study; Zuo CT critically revised the manuscript for important intellectual content, analyzed and edited the PET data, and conceived the study; Wang YH critically revised the manuscript for important intellectual content, conducted the DBS surgery, analyzed and edited neuropsychological data, and conceived the study.

Informed consent statement: Informed consent to publish was obtained from all the authors.

Abstract

BACKGROUND
Forniceal deep brain stimulation (DBS) has been proposed as an alternative treatment for Alzheimer’s disease (AD). Previous studies on mild to moderate AD patients demonstrated improvements in cognitive functions brought about by fornical DBS. Here, we report our longitudinal findings in one severe AD patient for whom the activities of daily living (ADL) rather than cognitive function significantly improved after 3 mo of continuous stimulation.

CASE SUMMARY
In 2011, a 62-year-old Chinese male with no previous history of brain injury or other neuropsychological diseases and no family history of dementia developed early symptoms of memory decline and cognitive impairment. Five years later, the symptoms had increased to the extent that they affected his daily living. He lost the ability to work as a businessman and to take care of himself. The patient was given a clinical diagnosis of probable AD and was prescribed donepezil and subsequently memantine, but no improvement in symptoms was observed. The patient then received DBS surgery. After 3 mo of continuous stimulation, the patient’s ADL score decreased from 65 points to 47 points, indicating the quality of the patient’s daily living improved distinctly. Other scores remained unchanged, suggesting no significant improvement in cognitive function. A follow-up positron emission tomography scan demonstrated perceivable...
obtained from the patient.

Conflict-of-interest statement: All the authors of this article declare that there is no conflict of interest regarding the publication of this article.

CARE Checklist (2016) statement: The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

Open-Access: This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and any changes are indicated.

Manuscript source: Unsolicited manuscript

Received: May 11, 2020
Peer-review started: May 11, 2020
First decision: June 7, 2020
Revised: June 11, 2020
Accepted: September 16, 2020
Article in press: September 16, 2020
Published online: October 26, 2020
P-Reviewer: Vinh-Hung V
S-Editor: Zhang L
L-Editor: Filipodia
P-Editor: Wang LL

INTRODUCTION

Alzheimer’s disease (AD), the leading cause of senile dementia, is a neurodegenerative disorder that is characterized neuropathologically by excessive β-amyloid (Aβ) retention and tau-protein accumulation. Extensive synaptic dysfunction and neuronal loss are present in the late stages, leading to consequent memory deficit and cognitive impairment[1]. While therapeutic medication approaches can fail to alter the course of AD[2], deep brain stimulation (DBS), a mature surgical treatment for various neuropsychiatric disorders[3-5], has recently been proposed as an alternative treatment for AD[6]. The fornix is believed to be an important part of the Papez circuit that is responsible for multiple memory functions[7]. Memory improvements induced by fornical DBS (f-DBS) were first unexpectedly discovered in the treatment of a patient with an eating disorder[8]. Inspired by this phenomenon, a series of phase-I and phase II clinical trials were conducted to explore the effectiveness of f-DBS for AD patients[9-13]. These studies focused on relatively mild AD, with the exclusion criteria of a Clinical Dementia Rating (CDR) greater than 1 or a Mini-Mental State Examination (MMSE) score less than 20. However, whether f-DBS could also benefit severe AD patients has not yet been investigated. To the best of our knowledge, the patient in our case is the first severe AD patient (CDR = 2 and MMSE = 1) to undergo f-DBS.

CASE PRESENTATION

Chief complaints

In 2011, a 62-year-old Chinese male with no previous history of brain injury or other neuropsychological diseases and no family history of dementia developed early symptoms of memory decline and cognitive impairment. Five years later, the symptoms had increased to the extent that they affected his daily living. He lost the ability to work as a businessman and to take care of himself.

History of present illness

The patient’s MMSE[14], Montreal Cognitive Assessment Basic (MoCA-B)[15], CDR[16] and global deterioration scale scores[17] were 1, 0, 2, and 6 points, respectively, indicating that his cognitive function was greatly impaired. The patient’s activities of daily living (ADL) score[18] was 65 points, showing that multiple domains of his daily

increased glucose metabolism in the classical AD-related brain regions.

CONCLUSION

Based on this case we hypothesize that fornical DBS may improve ADL through elevating regional glucose metabolism in the brain.

Key Words: Deep brain stimulation; Alzheimer’s disease; Fluorodeoxy glucose; Positron emission tomography; Activities of daily living; Case report

©The Author(s) 2020. Published by Baishideng Publishing Group Inc. All rights reserved.
living were affected. Cerebrospinal fluid tau, ptau, and Aβ<sub>1-42</sub> levels were all abnormal (Table 1), which was parallel with a distinctively positive [C-11] Pittsburgh compound B positron emission tomography (PET) scan and an [F-18] fluorodeoxyglucose PET scan with a typical AD-like hypometabolic pattern (Figure 1A).

**FINAL DIAGNOSIS**

The patient was given a clinical diagnosis of probable AD according to the National Institute on Aging-Alzheimer’s Association criteria.<sup>19</sup>

**TREATMENT**

The patient was prescribed donepezil 5 mg *quaque nocte*. However, no apparent alleviation of his symptoms was observed, even when he was subsequently prescribed donepezil 10 mg *quaque nocte*, and memantine 20 mg *quaque die*. Therefore, the neurosurgeons decided to accept him as a candidate for DBS at the fornix hoping to improve his impaired cognitive symptoms and quality of daily living. The study was approved by the Ethics Committee of the 101st Hospital of the People’s Liberation Army.

On March 1, 2017, the patient received DBS surgery after signing written informed consent. The electrodes were inserted 2 mm anterior and parallel to the vertical portion of the bilateral post-commissural fornix (Figures 1C and D). Continuous stimulation was delivered by the PINS stimulator system using the following parameters: C+, 1- and 5-, frequency = 130 Hz, voltage = 3.0 V, and pulse = 80 μs<sup>9,12</sup>.

**OUTCOME AND FOLLOW-UP**

After 3 mo of continuous stimulation, the patient returned for a follow-up assessment. Interestingly, only the ADL score decreased (from 65 points) to 47 points, indicating that the quality of the patient’s daily living had improved distinctly (Tables 2 and 3). Both basic and instrumental functions were improved, especially eating meals, dressing, bathing, shopping, and clipping his own toenails, the scores for which each decreased by no fewer than 2 points. Meanwhile, the MMSE, MoCA-B, CDR, and Global Deterioration Scale scores remained unchanged, suggesting that there was no distinct improvement in cognitive function. Since the patient refused to undergo a second lumbar puncture, which he thought was quite invasive, follow-up cerebrospinal fluid tau, ptau, and Aβ<sub>1-42</sub> results were not available. However, a follow-up [F-18] fluorodeoxyglucose PET scan demonstrated perceivable increased glucose metabolism in the classical AD-related brain regions, including the posterior cingulate cortices, superior parietal gyri, inferior parietal gyri, supramarginal gyrus, angular gyrus, and bilateral precuneus (Figure 1B). Semi-quantitative analysis revealed elevation of standardized uptake value ratio in these brain regions (using the global average as a reference) (Table 1).

**DISCUSSION**

According to previous mild AD studies, patients receiving f-DBS seemed to have a decreased rate of deterioration or even an improvement in cognitive functions.<sup>9</sup> However, the MMSE and MoCA-B scores of the patient in our case remained unchanged at 1 point and 0 points, respectively. Considering the patient’s severely impaired baseline cognitive status, the alterations in cognition and memory could have been concealed by the floor effect.

On the other hand, our results showed that the quality of daily living had significantly improved after 3 mo of continuous fornical stimulation, as demonstrated by the ADL scale, which is consistent with similar findings in a previous f-DBS clinical trial<sup>9</sup>. Since the ADL score is associated with multiple cognitive domains, we believe that the recovery of the ADL scores occurred along with the recovery of hypometabolism in multiple cerebral cortical regions responsible for different cognitive functions<sup>20,21</sup>. Among the previously noted regions, the angular gyrus is
Table 1 Cerebrospinal fluid assessment results (upper three lines) and neuropsychological assessment results (lower five lines) before and after f-deep brain stimulation treatment

<table>
<thead>
<tr>
<th>Assessments</th>
<th>Preoperative</th>
<th>Postoperative at 3 mo</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{A}\beta_{1-42}$</td>
<td>172.6 pg/mL</td>
<td>N/A</td>
<td>890-2980 pg/mL</td>
</tr>
<tr>
<td>tau</td>
<td>322 pg/mL</td>
<td>N/A</td>
<td>103-218 pg/mL</td>
</tr>
<tr>
<td>ptau</td>
<td>52.44 pg/mL</td>
<td>N/A</td>
<td>28.5-42.3 pg/mL</td>
</tr>
<tr>
<td>ADL</td>
<td>65</td>
<td>47</td>
<td>20-26</td>
</tr>
<tr>
<td>MMSE</td>
<td>1</td>
<td>1</td>
<td>27-30</td>
</tr>
<tr>
<td>MoCA-B</td>
<td>0</td>
<td>0</td>
<td>26-30</td>
</tr>
<tr>
<td>CDR</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>GDS</td>
<td>6</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

$\text{A}\beta_{1-42}$: Cerebrospinal fluid amyloid-beta 1-42 level; tau: Cerebrospinal fluid tau protein level; ptau: Cerebrospinal fluid phosphorylated tau protein level; ADL: Activities of daily living; MMSE: Mini-mental state examination; MoCA-B: Montreal cognitive assessment basic; CDR: Clinical dementia rating; GDS: Global deterioration scale; N/A: Not available.

Table 2 Preoperative activities of daily living

<table>
<thead>
<tr>
<th>Activity</th>
<th>Preoperative</th>
<th>Postoperative</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take a bus</td>
<td>4</td>
<td>Go up/downstairs</td>
<td>2</td>
</tr>
<tr>
<td>Go to a place near home, within walking distance</td>
<td>3</td>
<td>Get on/off bed, sit down/stand up</td>
<td>1</td>
</tr>
<tr>
<td>Prepare meal</td>
<td>4</td>
<td>Fetch water to cook/bathe</td>
<td>4</td>
</tr>
<tr>
<td>Do the housework</td>
<td>4</td>
<td>Take a bath</td>
<td>4</td>
</tr>
<tr>
<td>Take medicine</td>
<td>1</td>
<td>Cut toenail</td>
<td>4</td>
</tr>
<tr>
<td>Eat meal</td>
<td>3</td>
<td>Go shopping</td>
<td>4</td>
</tr>
<tr>
<td>Put on/take off clothes</td>
<td>4</td>
<td>Go to the toilet regularly</td>
<td>3</td>
</tr>
<tr>
<td>Brush hair/teeth</td>
<td>3</td>
<td>Make a phone call</td>
<td>4</td>
</tr>
<tr>
<td>Wash clothes</td>
<td>4</td>
<td>Take care of the money</td>
<td>4</td>
</tr>
<tr>
<td>Walk on flat floor indoors</td>
<td>1</td>
<td>Be home alone</td>
<td>4</td>
</tr>
</tbody>
</table>

Write down numeric points: 1 = can do it myself, 2 = have some difficulty doing but can still do it by myself, 3 = need help to do it, 4 = cannot do it at all.

associated with calculation and financial-skill deficit\(^{22}\), whereas the supramarginal gyrus is linked to object-related sensory integration and manipulation\(^{23}\). The precuneus is associated with visuomotor control, attention, and self-processing\(^{24}\). These structures are also components of the default-mode network, which plays a critical role in executive function, memory, and goal-directed behavior\(^{25}\) and thus in accomplishing complex daily activities.

CONCLUSION

Because the current discovery is derived from a single case observation, it is undeniable that verification in larger cohorts is required to reach a solid conclusion. It is also notable that all the previous clinical studies conducted a multi-step 1-year follow-up. Whether the alterations in clinical manifestations and the [F-18] fluorodeoxyglucose positron emission tomography of our case would be sustained after a full year of stimulation should be examined further. However, the preliminary findings in this case are promising and provide support for the future clinical application of fornical deep brain stimulation to severe AD patients.
Table 3 Postoperative activities of daily living at 3 mo

<table>
<thead>
<tr>
<th>Activity</th>
<th>Score</th>
<th>Activity</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take a bus</td>
<td>3</td>
<td>Go up/downstairs</td>
<td>2</td>
</tr>
<tr>
<td>Go to a place near home, within walking distance</td>
<td>2</td>
<td>Get on/off bed, sit down/stand up</td>
<td>1</td>
</tr>
<tr>
<td>Prepare meal</td>
<td>4</td>
<td>Fetch water to cook/bathe</td>
<td>3</td>
</tr>
<tr>
<td>Do the housework</td>
<td>3</td>
<td>Take a bath</td>
<td>2</td>
</tr>
<tr>
<td>Take medicine</td>
<td>1</td>
<td>Cut toenail</td>
<td>2</td>
</tr>
<tr>
<td>Eat meal</td>
<td>1</td>
<td>Go shopping</td>
<td>2</td>
</tr>
<tr>
<td>Put on/take off clothes</td>
<td>2</td>
<td>Go to the toilet regularly</td>
<td>2</td>
</tr>
<tr>
<td>Brush hair/teeth</td>
<td>2</td>
<td>Make a phone call</td>
<td>3</td>
</tr>
<tr>
<td>Wash clothes</td>
<td>4</td>
<td>Take care of the money</td>
<td>4</td>
</tr>
<tr>
<td>Walk on flat floor indoors</td>
<td>1</td>
<td>Be home alone</td>
<td>3</td>
</tr>
</tbody>
</table>

Write down numeric points: 1 = can do it myself; 2 = have some difficulty doing but can still do it by myself; 3 = need help to do it; 4 = cannot do it at all.

![Image of brain scans](image-url)
Figure 1  Positron emission tomography and regional standardized uptake value ratio. A: Positron emission tomography (PET) images of the severe Alzheimer’s disease (AD) patient who underwent fornical deep brain stimulation. Top row: Pre-operative [C-11] Pittsburg compound B PET. Middle row: Pre-operative [F-18] fluorodeoxyglucose PET: Hypometabolism is seen in typical AD-affected brain regions. Bottom row: Post-operative [F-18] fluorodeoxyglucose PET: Slight recovery of regional glucose metabolism can be seen after 3 mo of continuous f-deep brain stimulation (DBS); B: Regional standardized uptake value ratio (to global average) of 16 cognitively intact normal controls and the severe AD patient (both pre- and post-operative); C: Coronal computer tomography image (bone window), showing DBS electrode inserting into the post-commissural fornix (orange arrow); and D Coronal T1 magnetic resonance image showing DBS electrode inserting into the post-commissural fornix (orange arrow). L: Left; R: Right; PCC: Posterior cingulate cortex; SPG: Superior parietal gyrus; IPG: Inferior parietal gyrus; SMG: Supramarginal gyrus; AG: Angular gyrus; PrC: Precuneus.

ACKNOWLEDGEMENTS

The authors would like to thank Dr Huiwei Zhang and Dr Ping Wu from PET Center, Huashan Hospital, Fudan University, Shanghai, China for their aid in image processing and Dr Jie Zhu, Dr Yi Feng, and Dr Jirong Dong from the Department of Neurosurgery, Joint Logistics Support Unit No. 904 Hospital, Wuxi, Jiangsu, China and Dr Zhiqi Mao from the Department of Neurosurgery, PLA General Hospital, PLA Postgraduate Medical School, Beijing, China for their aids in DBS surgery and post-op management.
REFERENCES


14 Zhang Z, Hong X, Li H. The mini-mental state examination in the Chinese residents population aged 55 years and over in the urban and rural areas of Beijing. Zhonghua Shenjingke Za zhi 1999; 52: 149-153 [DOI: 10.3766/jissn.1.00002.1999.05.006]


Lin W et al. Forniceal DBS in severe AD