

Case Report

Auricular Acupunctures are Effective for the Prevention of Postoperative Agitation in Old Patients

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Postoperative cognitive problems and delirium are not uncommon in the elderly. We reported four cases in which auricular acupunctures on the ‘Shenmen’ and ‘Point Zero’ points successfully managed postoperative problematic behaviors of the three patients with dementia and the one patient postoperatively demonstrating an agitated behavior.

Keywords: agitation – auricular acupuncture – delirium – dementia

Introduction

Persistent postoperative cognitive problems and delirium are not uncommon in the elderly (1). Since postoperative agitation in the patients can lead to serious consequences for patients such as injury, hemorrhage and removal of drain tubes and catheters (2), physical and chemical restraints are commonly applied to restrain the patients. However, more humane methods are needed for the treatment.

Anesthesia is reportedly associated with thereafter the worsening of neurodegenerative disorders such as Alzheimer’s disease (3,4). Also, prior cognitive impairment and neurodegenerative disorder are significant risk factors for postoperative delirium (5,6). We report four cases in which auricular acupuncture at tranquilizing points successfully managed postoperative problematic behavior in patients with prior agitation.

Case Report

After obtaining approval from the Ethics Committees of Toki General Hospital, family members of each patient

consented to auricular acupuncture treatment and the publication of this case report. Table 1 shows the blood cell, blood gas, electrolyte and biochemical data of postoperative day (POD) 1 of the four cases. Clinical behavioral features during pre- and postoperation were evaluated by nurses. Observations of subjects was conducted each shift and recorded using the delirium observation screening (DOS) that is developed based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) diagnostic criteria (6–8). The DOS scale is with 13 items (Table 2) that can be rated as present or absent in less than 5 min. The highest total score is 13. Three or more points indicate a delirium. Table 3 shows the changes of the DOS.

Case 1

Auricular acupuncture for a 95-year-old man with dementia after cholecystectomy. A 95-year-old and 51 kg man was scheduled to have cholecystectomy. His medical history included Alzheimer’s disease and hypertension. He showed aggressive behavior not only for himself but also for the other. After the placement of an epidural catheter, general anesthesia was induced with fentanyl 50 µg and propofol 70 mg. Anesthesia was then maintained using 1.5–2% sevoflurane and epidural 2% lidocaine 8 ml. After the uneventful operation, he received occlusive press needles (Pyonex-small;

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Table 1. Blood cell, blood gas, electrolyte and biochemical data of POD 1

	Case 1	Case 2	Case 3	Case 4
RBC ($\times 10^4 \mu\text{l}^{-1}$)	338	348	370	316
WBC ($\times 10^2 \mu\text{l}^{-1}$)	59	66	93	96
Hb (g l^{-1})	9.2	9.3	11.3	9.1
pH	7.324	7.413	7.444	7.412
Paco ₂ (mmHg)	43.9	33.6	34.1	44.3
Pao ₂ (mmHg)	95	84	78	72
HCO ₃ ⁻ (mmol l^{-1})	22.2	21.0	23.0	27.7
Na ⁺ (mmol l^{-1})	143	136	139	142
K ⁺ (mmol l^{-1})	3.4	3.6	3.6	4.1
GOT (IU l^{-1})	26	25	38	26
GPT (IU l^{-1})	12	16	37	17
γ -GTP (IU l^{-1})	11	9	26	6
TP (g dl^{-1})	3.8	4.6	5.0	4.4
Alb (g dl^{-1})	2.0	2.5	3.1	2.7
BUN (mg dl^{-1})	15.1	12.3	10.9	7.9

Table 2. The DOS scale

The patient
1. Dozes during conversation or activities
2. Is easy distracted by stimuli from the environment
3. Maintains attention to conversation or action
4. Does not finish question or answer
5. Gives answers which do not fit the question
6. Reacts slowly to instructions
7. Thinks to be somewhere else
8. Knows which part of the day it is
9. Remembers recent event
10. Is picking, disorderly, restless
11. Pulls IV tubes, feeding tubes, catheters etc.
12. Is easy or sudden emotional (frightened, angry, irritated)
13. Sees persons/things as somebody/something else

Never = 0 point; Sometimes or always = 1 point. Items 3, 8 and 9 are rated in reverse.

Table 3. Changes of the DOS scale

	Pre	Ope	POD 1	POD 4	POD 9
Case 1	10	2	2	3	2
Case 2	8	1	3	0	0
Case 3	9	1	1	2	1
Case 4	0	1	6	2	2

Pre, the day before the scheduled operation; Ope, the day of the scheduled operation.

Seirin, Japan) at the 'Shenmen' and 'Point Zero' points at both auricles (9–11). The patient received fentanyl $15 \mu\text{g h}^{-1}$ and 1% lidocaine 2 ml h^{-1} epidurally for 2 days. We changed press needles every 3 days until POD 9. During the treatment, he did not show aggressive behavior. Although he resumed aggressive behavior on POD 10, he uneventfully discharged 3 weeks later.

Case 2

Auricular acupuncture for a 74-year-old woman with dementia after gastrectomy: A 74-year-old and 45 kg woman was scheduled to have distal gastrectomy.

She experienced delusion and showed wandering behavior. After the placement of an epidural catheter, general anesthesia was induced with fentanyl $50 \mu\text{g}$ and propofol 100 mg. Anesthesia was then maintained using 1.5–2% sevoflurane and epidural 2% lidocaine 8 ml. After the uneventful operation, she received auricular press needles at the 'Shenmen' and 'Point Zero' points at both auricles. The patient received fentanyl $20 \mu\text{g h}^{-1}$ and 1% lidocaine 2 ml h^{-1} epidurally for 2 days. We left the press needles until POD 7. During and after the treatment, she did not show wandering behavior. She uneventfully discharged 3 weeks later.

Case 3

Auricular acupuncture for an 81-year-old woman with dementia after thyroidectomy: An 81-year-old and 42 kg woman was scheduled to have subtotal thyroidectomy. Her medical history included dementia, diabetes mellitus and hypertension. She showed a decline in cognitive function. General anesthesia was induced with fentanyl $100 \mu\text{g}$ and propofol 50 mg. Anesthesia was then maintained using 1.5–2% sevoflurane with 50% nitrous oxide in oxygen and further intravenous fentanyl $10 \mu\text{g}$. After the uneventful operation, she received occlusive auricular press needles at the 'Shenmen' and 'Point Zero' points at both auricles. We changed press needles every 3 days until POD 9. During and after the treatment, she did not show problematic behaviors. She discharged 3 weeks later.

Case 4

Auricular acupuncture for a 72-year-old and postoperatively agitated woman: a 72-year-old and 48 kg woman was scheduled to have distal gastrectomy. After the placement of an epidural catheter, general anesthesia was induced with fentanyl $100 \mu\text{g}$ and propofol 100 mg. Anesthesia was then maintained using 1.5–2% sevoflurane and epidural 1.5% lidocaine 14 ml. After the uneventful operation, the patient received fentanyl $20 \mu\text{g h}^{-1}$ and 1% lidocaine 2 ml h^{-1} epidurally for 3 days. She became agitated and demonstrated aggressive behavior on POD 1. She was extremely difficult to restrain. She received occlusive auricular press needles at the 'Shenmen' and 'Point Zero' points at both auricles. Within a few hours, she became calm and showed no further signs of agitation. We changed press needles every 3 days until POD 9. During and after the treatment, she did not show agitated behaviors. She uneventfully discharged 3 weeks later.

Discussion

Since postoperative agitation can become dangerous and have serious consequences for patients such as injury,

hemorrhage and removal of drain tubes and catheters requiring physical and chemical restraint, postoperative progression of dementia and aggression is a challenge for anesthesiologists. Persistent postoperative cognitive problems occur in the elderly (1) and anesthesia is associated with thereafter the worsening of neurodegenerative disorders such as Alzheimer's disease (2), resulting in postoperative problematic behaviors such as aggression and agitation. Also, blood urea levels and blood balance in the postoperative period were found to be significant risk factors for delirium (5,6). We therefore described these data in this case report, and the data were within normal limits.

Non-pharmacological interventions such as acupuncture and acupressure applied on the traditionally used acupuncture points have been used for perioperative management (12–14). These interventions also result in tranquilization and decrease anxiety not only in healthy volunteers but also in patients (15,16). Especially, auricular acupuncture at tranquilizing points reduces anxiety among healthy volunteers and adult patients undergoing surgery (10,11).

The present agitated patients received occlusive auricular press needles at the 'Shenmen' point, tranquilizing the mind, and the 'Point Zero' point, generating a general homeostatic balance and supporting the actions of other auricular points, at both auricles (9) and then the patients did not show problematic behaviors such as aggression and agitation (that could have led serious consequences) during the application of the auricular press needles. Their tranquility might have been obtained by chance. However, acupuncture reduces behavioral hyperactivity in rats sensitized to morphine (17). Also, a study showed that acupressure decreases agitation behavior in patients with dementia (18). In traditional Chinese medicine, it is believed that dementia results from disorders of the five organs (including liver, heart, spleen, lung and kidney). Acupoint stimulation could regulate these five organs, thereby controlling agitated behaviors (18) (Fig. 1). Moreover, we planned a randomized controlled trial about the effect of auricular acupuncture on postoperative behavior in elderly patients and the study is under investigation. Almost all patients who received occlusive auricular press needles at the Shenmen and Point Zero points did not show problematic behaviors during postoperative period. We therefore postulate that auricular acupuncture at the specific points would be useful for the management of postoperative delirium in the elderly.

In summary, auricular acupuncture successfully managed postoperative problematic behaviors in old patients. This technique may have a potential to control old patients showing an agitated behavior.

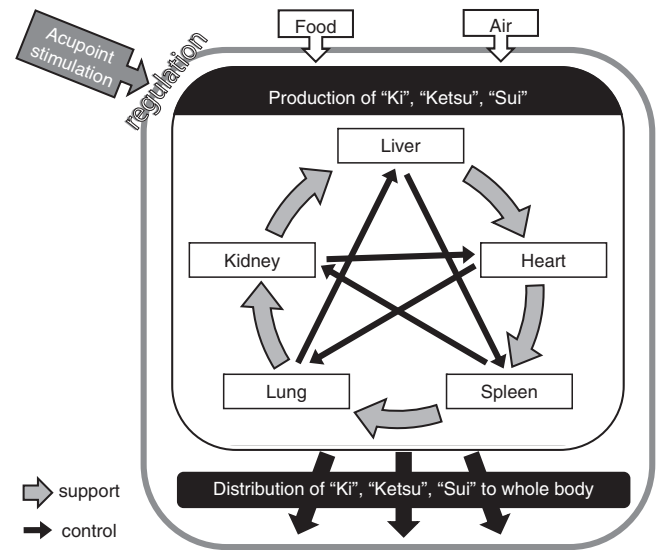


Figure 1. The effect of acupoint stimulation on agitated behaviors.

References

1. Ancelin ML, de Roquefeuil G, Ledesert B, Bonnel F, Cheminal JC, Ritchie K. Exposure to anaesthetic agents, cognitive functioning and depressive symptomatology in the elderly. *Br J Psychiatry* 2001;178:360–6.
2. Bone I, Rosen M. Alzheimer's disease and anaesthesia. *Anaesthesia* 2000;55:592–3.
3. Bohnen NI, Warner MA, Kokmen E, Beard CM, Kurland LT. Alzheimer's disease and cumulative exposure to anesthesia: a case-control study. *J Am Geriatr Soc* 1994;42:198–201.
4. Bohnen N, Warner MA, Kokmen E, Kurland LT. Early and midlife exposure to anesthesia and age of onset of Alzheimer's disease. *Int J Neurosci* 1994;77:181–5.
5. Santos FS, Velasco IT, Fráguas R Jr. Risk factors for delirium in the elderly after coronary artery bypass graft surgery. *Int Psychogeriatr* 2004;16:175–193.
6. Ushida T, Yokoyama T, Kishida Y, Hosokawa M, Taniguchi S-I, Inoue S, et al. Incidence and risk factors of post-operative delirium in cervical spine surgery. *Spine* in press.
7. Gao R, Yang ZZ, Li M, Shi ZC, Fu Q. Probable risk factors for postoperative delirium in patients undergoing spinal surgery. *Eur Spine J* 2008;17:1531–7.
8. Gemert van LA, Schuurmans MJ. The Neecham Confusion Scale and the Delirium Observation Screening Scale: capacity to discriminate and ease of use in clinical practice. *BMC Nurs* 2007;6:3.
9. Oleson T. *Auriculotherapy Manual: Chinese and Western System of Ear Acupuncture*, 2nd edn. Los Angeles, CA: Health Care Alternatives, 1996.
10. Wang SM, Kain ZN. Auricular acupuncture: a potential treatment for anxiety. *Anesth Analg* 2001;92:548–53.
11. Wang SM, Peloquin C, Kain ZN. The use of auricular acupuncture to reduce preoperative anxiety. *Anesth Analg* 2001;93:1178–80.
12. Zárate E, Mingus M, White PF, Chiu JW, Scuderi P, Loskota W, Daneshgari V. The use of transcutaneous acupoint electrical stimulation for preventing nausea and vomiting after laparoscopic surgery. *Anesth Analg* 2001;92:629–35.
13. Fassoulaki A, Papilas K, Sarantopoulos C, Zotou M. Transcutaneous electrical nerve stimulation reduces the incidence of vomiting after hysterectomy. *Anesth Analg* 1993;76:1012–4.
14. Wang B, Tang J, White PF, Naruse R, Sloninsky A, Kariger R, Gold J, Wender RH. Effect of the intensity of transcutaneous

- acupoint electrical stimulation on the postoperative analgesic requirement. *Anesth Analg* 1997;85:406–13.
15. Fassoulaki A, Paraskeva A, Patris K, Pourgiezi T, Kostopanagiotou G. Pressure applied on the extra 1 acupuncture point reduces bispectral index values and stress in volunteers. *Anesth Analg* 2003;96:885–90.
 16. Arai YC, Ushida T, Matsubara T, Shimo K, Ito H, Sato Y, Wakao Y, Komatsu T. The influence of acupressure at extra 1 acupuncture point on the spectral entropy of the EEG and the LF/HF ratio of heart rate variability. *Evid Based Complement Alternat Med* 2008; doi:10.1093/ecam/nen061.
 17. Kim MR, Kim SJ, Lyu YS, Kim SH, Lee Y, Kim TH, Shim I, Zhao R, Golden GT, Yang CH. Effect of acupuncture on behavioral hyperactivity and dopamine release in the nucleus accumbens in rats sensitized to morphine. *Neurosci Lett* 2005;387:17–21.
 18. Yang MH, Wu SC, Lin JG, Lin LC. The efficacy of acupressure for decreasing agitated behaviour in dementia: a pilot study. *J Clin Nurs* 2007;16:308–15.

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