

SHORT REPORT

Postictal psychosis as a risk factor for mood disorders after temporal lobe surgery

Kousuke Kanemoto, Jun Kawasaki, Estuko Mori

Abstract

This study investigated the psychiatric consequences of 38 consecutive patients who had surgery for intractable temporal lobe epilepsy with special attention to postoperative mood disorders. A close interrelation between preoperative postictal psychosis and postoperative manic or depressive episodes was suggested. Left sided lobectomy augmented this correlation. Because the first sign of postoperative manic and depressive episodes appeared within 1 month and 2 months respectively, cautious psychiatric follow up for several months after surgery proved to be crucial to prevent postoperative suicides. Postoperative manic depressive episodes disappeared within the first 2 years after operation without exception, if treated suitably. This suggests that we do not have to preclude patients with postictal psychosis as surgical candidates, but measures must be taken to prevent postoperative depressions.

(*J Neurol Neurosurg Psychiatry* 1998;65:587-589)

Keywords: epilepsy; mood disorder; temporal lobectomy; postictal psychosis

The occurrence of frank psychiatric illness after temporal lobectomy has been neglected. Most surgical centres had given up surgical treatment in cases with gross mental changes after initial vigorous trials. Indeed, after the study by Simmel and Counts,¹ most authors agree that patients who are chronically psychotic before surgery continue to be so or even deteriorate postoperatively. However, the important issue of what is the postoperative psychiatric status of patients who have intermittent acute psychoses preoperatively remains unsettled.²⁻¹⁰ Furthermore, the fact that new psychoses develop after surgery in some patients with no history of psychiatric illness, even despite complete remission of the seizures, should be a strong warning to surgical candidates and they should be prepared beforehand, because this will help them greatly to cope with the postoperative psychiatric difficulties. Indeed, in view of the high incidence of suicidal cases during the first few years after temporal lobectomy alone,^{11 12} the need for continuing psychiatric observation of the oper-

ated patients is apparent. However, in marked contrast to meticulous psychological assessment, this has scarcely been done. Pathological affective states after temporal lobectomy have received even less attention, except for notable exceptions in the Maudsley series.^{2 7 8} To date, there have been no papers specially dedicated to this topic. This is an attempt to rectify the situation.

Subjects and methods

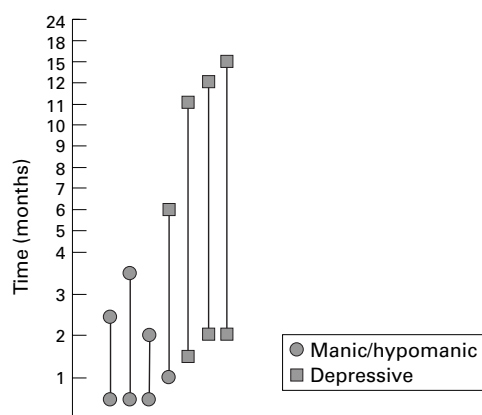
This study comprised all patients (n=38) who had undergone inferior (or inferior and middle) temporal lobectomy with hippocampoamygdalotomy at the Kansai Regional Epilepsy Center from 1989 to 1996 with a minimum follow up period of 2 years after the surgery. Among them, eight patients exhibited mood disorders (manic, hypomanic, or major depressive episodes) after surgical intervention. The diagnosis of mood disorders was based on DSM IV.¹³ The preoperative episodes of psychoses were divided into two types as described previously; one type occurred in close association with clusters of complex partial seizures (postictal psychosis) and the other type occurred with abolition or remarkable diminution of seizures (acute interictal psychosis). Patients in chronic psychotic states had been excluded as surgical candidates beforehand. Because our preliminary study¹⁵ had confirmed that the first sign of psychiatric complications, including suicide attempts, almost always occurred within the first 4 months after the operation, patients were recommended in principle to remain in hospital during this period.

We compared patients with postoperative mood disorders (MD group) with those without (non-MD group). Sex, age at the time of the operation, duration of epilepsy, side of lobectomy and language dominance, full scale IQ, surgical results estimated according to Engel's classification,¹⁶ and types as well as incidence of preoperative psychotic episodes and seizures were compared. Language dominance was decided with the intravenous amytal test. Febrile convulsion lasting for more than 15 minutes or with a transient postictal neurological sign were termed complicated febrile convulsions. Statistical analyses were made by χ^2 test with Yates' correction for small numbers, and *t* test.

Kansai Regional Epilepsy Center, Utano National Hospital, Kyoto, Japan
K Kanemoto
J Kawasaki
E Mori

Correspondence to:
Dr Kousuke Kanemoto,
Utano National Hospital,
Ukyo-ku, Narutaki,
Ondoyama-cho 8, Kyoto-fu,
Kyoto-shi, Japan. Telephone
0081 754615121.

Received 21 January 1998
and in revised form
5 May 1998
Accepted 13 May 1998



Duration of postoperative mood disorders (patients 35, 31, 29, 15, 6, 5, and 1 from left to right. Patient 18 was excluded because of insidious onset of a manic episode).

Results

Among eight patients with manic, hypomanic, or depressive episodes after surgery, three had depressive, four had manic or hypomanic, and the other had manic depressive episodes. The duration of manic or hypomanic episodes were short (1 to 3 months; patients 15, 18, 31, 35). They started within 1 month and disappeared within 4 months of surgery. Depressive episodes lasted somewhat longer (6 to 15 months; patients 1, 5, and 6). They appeared 1 or 2 months after lobectomy and disappeared within the first 2 years. In patient 29, a short phase (about 1 month) of manic state was followed by a relatively long phase (about 3 months) of depressive state (figure). Patients 5, 6, and 29 benefited from tricyclic antidepressant drugs. All these manic, hypomanic, or depressive states resolved and have not recurred. It should also be noted that all the patients with a preoperative history of postictal psychoses who later developed mood disorders after temporal lobectomy had ictal fear as an aura.

The incidence of preoperative episodes of postictal psychosis were five times more frequent in the MD group (38%) than in the

non-MD group (7%). Patients with a left sided lobectomy predominated in the patients with postoperative mood disorders (88% *v* 50%). The simultaneous presence of these two factors predisposed the patients operated on to subsequently develop mood disorders with a significantly higher frequency ($\chi^2=4.62$, $p<0.05$, table).

Discussion

Hill *et al*¹⁹ were one of the first groups of authors to recognise that depressions could occur after temporal lobectomy. In the series evaluated by Taylor,¹¹ five patients committed suicide. In another follow up study, Taylor and Marsh¹² reported that the mortality during the first 2 years postoperatively was double that in any subsequent 2 year period. All suicide attempts occurred within the first postoperative month in the Danish series investigated by Jensen and Larsen.^{3, 20} In our series, postoperative depression always started during the first 4 months.

Surprisingly, our study suggested that patients with preoperative histories of postictal psychosis and left sided pathology had a higher risk of developing mood disorders postoperatively. As in the re-evaluation of the Maudsley series by Bruton,² we found that depressions occurred more than twice as often in patients undergoing a left sided lobectomy ($n=7$) than in those undergoing a right sided lobectomy ($n=3$). These risk factors need to be amplified by additional evidence. However, until it is proved otherwise, we should keep patients, especially those with such risk factors, under close observation at least during the first 4 months after lobectomy. Considering that manic or depressive episodes, by contrast with paranoid states, rarely recur once resolved, this remedy is all the more important. Peculiar dysphoric states immediately after surgery as well as the presence of ictal fear coupled with postictal psychoses may also predict the later development of postoperative mood disorders.

A literature search failed to find any descriptions of postoperative hypomanic or manic states except for our recent report.¹⁷ The current study confirmed the presence of a substantial number of postoperative transient manic or hypomanic states and, as already mentioned, the close relation of postoperative mood disorder to the preoperative postictal psychoses. Considering the intrinsic interrelatedness of postictal psychosis with dramatic affective change,^{14, 21, 22} this preponderance of postoperative mood change among patients with postictal psychosis was very impressive.

The postoperative affective psychosis was overrepresented in patients with left sided lobectomy in our series. By contrast, just as Trimble had summarised,¹⁰ new paranoid psychoses that appeared after the operation were almost always found in patients with right sided lobectomy in our series.¹⁵ This laterality effect of temporal lobectomy was the reverse of the well known theory of Flor-Henry,²³ who theorised that left sided epileptic activity was coupled with schizophreniform psychosis whereas right sided seizures led to affective

Risk factors of postoperative mood disorders

Postoperative mood disorder	No (n=30)	Yes (n=8)
Sex (F/M)	16/14	3/5
Age at operation (y, mean (SD))	26.1 (6.5)	26.8 (3.8)
Age at onset (y, mean (SD))	10.5 (5.4)	7.9 (4.9)
Duration of epilepsy (y, mean (SD))	15.6 (8.6)	18.9 (6.5)
Full scale IQ (mean (SD))	87.9 (10.6)	94.3 (10.9)
Preoperative psychosis (n (%)):		
Acute interictal P	8/30 (27)	0/8 (0)
Postictal P	2/30 (7)	3/8 (38)
Prolonged FC (n (%))	12/30 (40)	1/8 (12)
Left lobectomy (n (%))	16/30 (53)	7/8 (88)
Left lobectomy plus preoperative postictal P (n (%))	1/30 (3)	3/8 (38)*
Language dominance	4/20	1/6
Seizures (n (%)):		
Psychic aura	12/30 (40)	3/8 (38)
Autonomic aura	13/30 (43)	4/8 (50)
GTC	15/30 (50)	5/8 (62)
Histology of resected tissue (n (%)):		
MTS	26/30 (87)	7/8 (88)
Tumour	2/30 (7)	1/8 (12)
Normal tissue	2/30 (7)	
Results of operation, Engel's class(n (%)):		
I	24/30 (80)	7/8 (88)
II	3/30 (10)	1/8 (12)
III/IV	3/30 (10)	0/8 (0)

* $\chi^2 = 4.62$, $p<0.05$ (Yates' modification).

P=psychosis; MTS=mesial temporal sclerosis.

psychosis. The predominance of the postoperative affective psychosis in left sided lobectomies apparently contradicts recent reports that stress the predominant role of the right hemisphere in secondary mania.^{24 25} Excitatory lesions such as epileptic foci could have converse effects. Whether this laterality effect is simply a coincidental artifact due to the few patients in the sample or means something important remains to be elucidated.

There are methodological limitations in this study. The sample was not unbiased, as we are one of the tertiary centres for especially intractable epilepsies. Most of the patients with identifiable lesions are treated operatively in the preceding medical facilities with the result that only patients without apparent MRI lesions come to us. This obviously heightens the proportion of patients with mesial temporal sclerosis in our series. Occurrences of psychotic episodes urge patients and families to seek more intensive medical care. This possibly increases the incidence of patients with psychotic episodes in tertiary centres such as ours. In addition, eight patients are too few to permit any definite conclusions. The suggestions drawn from our data remain tentative and need amplifying and further strengthening.

Ferguson and Rayport²⁶ studied lobectomised patients and made an excellent psychological explanation of the postoperative distress in some patients as a failure of the reversed rehabilitation process of learning to live without handicap. The biological factors influencing postoperative mental states demonstrated by our supplements that study. Taking these biological factors into consideration helps us to understand more precisely the psychosocial dynamics presented by Ferguson and Rayport.²⁶

Our data clearly suggest, just as those of the Maudsley series, that cautious surveillance and prompt treatment of the postoperative mood disorder is an indispensable constituent of the surgical therapy for intractable temporal lobe epilepsy because neglect of this could lead to unnecessary death or could substantially delay the social adjustment of the patients. The risk factors found in this study could lead to more appropriate postoperative follow up protocols.

We dedicate this work to the deceased Dr Itsuo Kawai, the founder of the Kansai Regional Epilepsy Center, our great teacher, and our intimate friend.

- 1 Simmel ML, Counts S. Clinical and psychological results of anterior temporal lobectomy in patients with psychomotor epilepsy. In: Baldwin M, Bailey P, eds. *Temporal lobe epilepsy*. Springfield, IL: Thomas, 1958:530–50.
- 2 Bruton CJ. *The neuropathology of temporal lobe epilepsy*. Oxford: Oxford University Press, 1988. (Maudsley Monograph No 31.)

- 3 Jensen I, Larsen JK. Psychoses in drug resistant temporal lobe epilepsy. *J Neurol Neurosurg Psychiatry* 1979;42:948–54.
- 4 Mace CJ, Trimble MR. Psychosis following temporal lobe surgery: a report of six cases. *J Neurol Neurosurg Psychiatry* 1991;54:639–44.
- 5 Polkey CE. Effects of anterior temporal lobectomy apart from the relief of seizures. *J R Soc Med* 1983;76:354–8.
- 6 Stevens JR. Psychiatric consequences of temporal lobectomy for intractable seizures: a 20–30 year follow up of 14 cases. *Psychol Med* 1990;20:529–45.
- 7 Taylor DC. Mental state and temporal lobe epilepsy. A correlative account of 100 patients treated surgically. *Epilepsia* 1972;13:727–65.
- 8 Taylor DC. Factors influencing the occurrence of schizophrenia-like psychosis in patients with temporal lobe epilepsy. *Psychol Med* 1975;5:249–54.
- 9 Walker AE, Blumer D. Behavioral effects of temporal lobe epilepsy. In: Blumer D, eds. *Psychiatric aspects of epilepsy*. Washington, American Psychiatric Press, 1984:295–323.
- 10 Trimble MR. *The psychosis of epilepsy*. Raven Press, New York, 1991.
- 11 Taylor DC. Epileptic experience, schizophrenia, and the temporal lobe. *McLean Hospital Journal, special issue*, 1977: 22–39 (cited in Trimble¹⁰).
- 12 Taylor DC, Marsh SM. Implications of long term follow up in epilepsy: with a note on the cause of death. In: Penry JK, eds. *Epilepsy: The 8th International Symposium*. New York: Raven Press, 1977:27–34.
- 13 American Psychiatric Association. *Diagnostic and statistical manual of mental disorders, 4th ed; DSM IV*. Washington, DC: American Psychiatric Association, 1994.
- 14 Kanemoto K, Kawasaki J, Kawai I. Postictal psychoses: a comparison with acute interictal and chronic psychoses. *Epilepsia* 1996;37:551–6.
- 15 Kanemoto K, Kawasaki J, Kawai I. Psychiatric manifestations following anterior temporal lobectomy. *Journal of the Japan Epilepsy Society* 1995;13:202–10.
- 16 Engel J Jr, Van Ness PC, Rasmussen TB, et al. Outcome with respect to epileptic seizures. In: Engel J Jr, ed. *Surgical treatment of the epilepsies*. 2nd ed. New York: Raven Press, 1993:609–21.
- 17 Kanemoto K. Hypomania after temporal lobectomy: a sequela to the increased excitability of the residual temporal lobe? *J Neurol Neurosurg Psychiatry* 1995;59:448–54.
- 18 Kanemoto K. Perictal Capgras syndrome after clustered ictal fear: depth-electroencephalogram study. *Epilepsia* 1997;38:847–50.
- 19 Hill D, Pond DW, Mitchell W, et al. Personality changes following temporal lobectomy for epilepsy. *Journal of Mental Science* 1957;103:18–27.
- 20 Jensen I, Larsen JK. Mental aspects of temporal lobe epilepsy: follow up of 74 patients after resection of a temporal lobe. *J Neurol Neurosurg Psychiatry* 1979;42:256–65.
- 21 Logsdail SJ, Toone BK. Postictal psychoses. *Br J Psychiatry* 1988;152:246–52.
- 22 Savard G, Andermann F, Olivier A, et al. Postictal psychosis after partial complex seizures: a multiple case study. *Epilepsia* 1991;32:225–31.
- 23 Flor-Henry P. Psychosis and temporal lobe epilepsy. *Epilepsia* 1969;10:363–95.
- 24 Mandal MK, Asthana HS, Pandey R, et al. Cerebral laterality in affect and affective illness: a review. *J Psychol* 1996;130:447–59.
- 25 Ghika-Schmid F, Bogousslavsky J. Affective disorders following stroke. *Eur Neurol* 1997;38:75–81.
- 26 Ferguson SM, Rayport M. Living with epilepsy. *Journal of Nervous and Mental Disease* 1965;140:26–37.