Only with appropriate trials of medication, considering the possible origins of these delusions in affective disorder, can the importance of this category of delusional content be understood.

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A Case of Self-Inflicted Leucotomy

A suicide attempt with a gun resulted in left frontal lobe damage in a 19-year-old obsessive man. While intelligence did not suffer and no frontal lobe syndrome emerged, the patient's obsessive rituals were significantly reduced.

The advance of medicine is frequently furthered by natural experiments, as this report of unintended psychosurgery, in a patient with severe obsessive compulsive disorder (OCD), vividly illustrates.

Case report

On 11 November 1983, Tom, 19 years old, was found with blood running down his face. He had shot himself through the mouth with a .22 calibre rifle. Shortly thereafter, he was admitted to neurosurgery.

A CT scan revealed blood in both maxillary sinuses. The bullet had penetrated through the ethmoid sinus and the cribriform plate, and penetrated to the base of the left frontal lobe. The bullet was lodged in the premotor cortex, and fragments could be seen along the left-side pathway through the head of the caudate nucleus and splenum of the corpus callosum. The patient manifested a mild right-sided hemiplegia, involving the leg more than the arm.

The onset of his OCD followed shortly after he became aware of his homosexuality at age 10 (father accepted it but mother was very upset). Obsessive ideas of contamination, and minor checking and hand-washing rituals did not interfere with his life, including his studies, until age 15. He was then admitted to hospital for OCD, and treated with a combination of exposure and response prevention and supportive psychotherapy, but without benefit. At age 16 he first presented to one of the authors (LS), suffering from compulsive doubt, checking, hand-washing, and shower-taking. He was also depressed, feeling hopeless, lacking interest and pleasure in almost everything, feeling weak and tired, oversleeping, and blaming himself for not being able to continue his studies or go to work. Formerly an 'A' student, his grades had deteriorated and he had left school. When psycho-, behaviour, and pharmacotherapy (clomipramine to 200 mg daily) effected no change in OCD or mood, he left treatment.

During the next two years he made two suicide attempts, thinking that if he sacrificed his life, he would expiate God, his father would drink less, and his mother would be more loving and kind. He then returned to treatment. His depression was more severe, and in addition to the earlier OCD symptoms, he had to repeat ideas in order to gain perfection, and had to recall 50 different chants.

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He was placed on phenelzine 15 mg t.i.d. Three weeks later, he became frightened at his inability to ejaculate. His mother threatened him with commital to a mental institution, and when he complained to her about how wretched he felt, she replied: "Go and shoot yourself." Five minutes later he did so.

Three weeks after neurosurgery, he underwent neuropsychological testing and an initial assessment of OCD. The same obsessions as before the suicide attempt were present, but at a much lower frequency and intensity. His bathroom rituals had decreased from four hours pre-injury to half an hour.

During the next two months he remained in hospital on the psychiatric ward, where he received behaviour (exposure and response prevention) and drug therapy (phenelzine to 75 mg daily). His compulsive hand-washing, toilet ritual and checking were gradually reduced to a daily average of 15 minutes. Because he remained depressed, he was placed on carbamazepine 400 mg b.i.d. After two weeks, he rated himself as "mostly cheerful". He was discharged, and followed up at monthly intervals. He continued on carbamazepine for one year but did not receive further behaviour therapy.

At two years post-discharge, his mood remained consistently calm and cheerful. He completed his high school education. His obsessions were minimal – he remained intolerant of disorder and demanded that the kitchen and bathroom be kept spotless.

Neurological examination was normal except for anosmia. A CT scan revealed that part of the left frontal lobe was infarcted. There was no sign of social disinhibition, tactlessness, or lack of drive – no indication of frontal-lobe syndrome.

On neuropsychological measures, he showed impairment of right-handed fine motor co-ordination, and right-hand performance in the Finger Tapping test (Reitan & Davison, 1974); impairment was shown also on the Controlled Oral Word Association Test (Benton, 1968), which is particularly sensitive to left frontal damage (Crockett *et al*, 1986). Performance on the Wisconsin Card Sorting Test was unimpaired. Patients with right frontal lobe lesions make more errors on this task (Drewe, 1974).

There was marked improvement in intellectual functioning. Scores for IQ on the Wechsler Adult Intelligence Scale before (1980) and after (February 1984) the suicide attempt and at two-year follow-up (February 1986) were

verbal: 115, 110, 121
performance: 117, 120, 140
full scale: 116, 114, 133.

There was also marked improvement on psychometric tests of obsessions (self-rating), fears and phobias (Fear Survey Schedule), anxiety (Institute for Personality and Ability Testing Anxiety Scale), and introversion and neuroticism (Maudsley Personality Inventory). At the three testing points (before, after and follow-up) his Leyton Obsessive Inventory scores were

symptom: 32, 21, 12 ($P<0.01$)
resistance: 38, 32, 13 ($P<0.05$)
interference: 51, 24, 11 ($P<0.01$)

and Beck Depression Inventory scores were -32, 6 and 5 ($P<0.05$).

Discussion

It seems likely that the observed changes were not just coincidental to the self-inflicted psychosurgery. The rate of spontaneous remission or, at least, improvement in OCD patients is estimated at 40% (Rachman & Hodgson, 1980) to 70% (Pollitt, 1957). The most favourable estimates include cases of recent onset (e.g. three-month duration for adult onset), and show a slower time course. Black (1974), however, summarising four major reports, found a static course in 54–61%, and progressive worsening in 33%. In the case described here, early onset and a chronic, progressively worsening course, the dramatic and almost immediate effects of unilateral leucotomy, and the sustained improvement over two years rule out spontaneous remission.

There is a striking similarity between the anatomic and psychological changes of our patient and those reported after psychosurgery of the fronto-orbital cortex and anterior cingulum. Kelly (1973) cites dramatic changes in mixed depressive and obsessional states, the depressive symptoms being relieved by the frontal lesion, and the obsessive symptoms by the cingulectomy, with intelligence, learning, drive level, and control unaffected.

The neuropsychological and power spectral findings of Flor-Henry *et al* (1979) suggest predominantly left frontal function in OCD, and this is consistent in the present case with the site of the lesion.

The issue of concomitant factors should be raised. Several factors may have influenced the OCD in addition to the anatomical change. The drama of the suicide attempt, with its attendant notion of 'hitting bottom'; the subsequent stay in hospital, necessitating removal from a noxious home environment; perhaps the mother's changed behaviour, being somewhat more regretful than earlier, may all have been instrumental in bringing about the observed improvement. However, previous suicide attempts, periods in hospital, and removal from the home had not improved his condition. In a fashion similar to that achieved by psychosurgery, the self-inflicted left frontal damage altered the course of OCD. Hence we conclude that in this case of self-inflicted neurosurgery, the change in brain anatomy led to the psychological change – a change that seems to be permanent.

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