Use of anti-epileptic medication in treating "flashbacks" from hallucinogenic drugs

H. John Thurlow, M.A., M.D. and John P. Girvin, M.D., PH.D., F.R.C.S.[C], *London, Ont.*

Recurrent visual hallucinations ("flashbacks") occurring up to one year after taking LSD have been reported by several investigators.[1-7] Horowitz[1] has provided an excellent description of this phenomenon, commenting that the hallucinations are primarily visual but can occur in other sensory modalities, that they can be precipitated by marijuana, alcohol, barbiturates, fatigue and stress,* and that use of *any* of the major hallucinogens† may be followed by flashbacks with an estimated frequency of about one in 20 cases (although the exact incidence is not known). Horowitz notes some similarity of flashbacks to the auras of epilepsy or migraine, and to sensory experience resulting from electrical stimulation of the eye or brain. Flashbacks are most common following repeated use of hallucinatory drugs, but have been reported following even a single drug experience.[3, 8]

In reviewing the pharmacology, medical use and risks of LSD, Louria[11] lists flashbacks as one of its dangers, and comments that the determinants of this phenomenon are not known. In reviewing the literature on unfavourable reactions to LSD, Smart and Bateman,[12] although commenting that LSD is short-lasting in the body,** conclude that "the connection between frequent ingestion of LSD and recurrent experiences suggests that LSD itself or some of its effects may persist or build up over repeated administration to cause a recurring experience, particularly under stress."

The etiology of flashbacks is obscure. Postulates have been suggested in articles by Frosch, Robbins and Stern,[2] Rosenthal[7] and Horowitz.[1] These include hypotheses of brain damage, release of stored drug (or a metabolite of it), psychological conditioning, disinhibition of "imagery function", "mystical theories" and psychodynamic explanations (hallucinations may have a content of apparent psychodynamic significance, but they may occur in the absence of any other evidence of psychoses or neuroses, and may in fact be abstract colour forms without any obvious psychodynamic content).[7]

The following history is presented to illustrate the use of anti-epileptic medication in managing a case of recurring flashbacks.

Case history

Miss A.L., a 21-year-old university student, was seen early in the spring of 1970. She had been using hallucinogenic drugs over the previous year, and at the time of consultation was chiefly concerned about recurring hallucinations while *not* taking drugs ("flashbacks"). Other problems surrounded intermittent feelings of depression, general difficulty with peer and family relationships, and concern about her academic future.

She began using hallucinogenic drugs in November 1968 when she took a single dose of LSD. From February 1969 onwards there was frequent use of marijuana, hashish, LSD and other potent hallucinogens. These were used on an average of at least once a week. She had injected methedrine ("speed") once a month for several months. She discontinued all hallucinogenic drugs in January 1970.

The visual hallucinatory flashbacks began in the summer of 1969, approximately four months after the start of fairly regular drug usage. They continued virtually unchanged from their onset until early in April 1970.

The patient described two groups of visual hallucinations, "little ones" and "big ones". Both types had an increased frequency in dark illumination (particularly at night), a tendency to increase when the subject intently concentrated on "seeing things", and a very definite increase in their frequency (and to some extent in their intensity) with fatigue.

The "little" hallucinations were present daily and consisted of achromatic and sometimes vividly coloured patterns occurring particularly while looking at blank surfaces such as paper or walls. Occasionally there was distortion of faces, e.g. the eyes "coming together to form one eye" in the middle of the head.

The "big" hallucinations were more vivid and of better recognized forms. She would frequently be unable to realize that they were actually hallucinations. On one occasion the patient saw a dead cat in her closet, quickly looked away only to see another lying on her desk, and finally awoke her roommate for reassurance that the "dead cats" were only hallucinations. On another occasion she saw a frog suddenly appear in her visual field jumping across a desk, but when she looked back, the frog was gone. Many times she would see persons without being able to recognize their distinct facial characteristics. They usually appeared in her left visual field at varying distances, and would disappear quite suddenly. These hallucinations would typically occur several times each day while she was not under the immediate influence of LSD.

Although the hallucinations were primarily visual, approximately 2% were auditory in nature and consisted of sounds such as vague "air terminal announcements" or footsteps.

A general feeling of being "stoned" (a feeling of detachment from reality reported by drug users when directly under the influence of the chemical) was associated with about three-quarters of her visual hallucinations. In approximately one-half of these the feeling *preceded* the hallucinations by a few seconds or a minute and remained during and after the hallucinations. This feeling would appear and disappear paroxysmally. Following the episodes the patient occasionally experienced some confusion in her speech (and commented that this was common among drug users); e.g. she might transpose words as in saying, "I heard them over talking" rather than "I heard them talking it over."

On functional enquiry, she stated that when arising suddenly she might stumble, usually toward the left. Also, many of the movements in the visual hallucinations were noticed in the *left* visual field. There

From the University of Western Ontario, London, Ontario.

H. JOHN THURLOW, M.A., M.D., Counsellor, Student Health Service; Assistant Professor, Department of Community Medicine; Lecturer, Department of Psychiatry.
JOHN P. GIRVIN, M.D., PH.D., F.R.C.S.[C], Assistant Professor of Neurosurgery, Department of Clinical Neurological Sciences; Assistant Professor of Physiology.
Reprint requests to: Dr. H. John Thurlow, Department of Community Medicine, University of Western Ontario, London, Ontario.

*Accentuation of hallucinations by hyperventilation is described by Allen and Agus.[9]

†Flashbacks following use of marijuana are described by Keeler, Reifler and Liptzin.[10]

**Blood levels of LSD rapidly diminish.[13]

were no olfactory or gustatory hallucinations. She had a number of *déjà vu* phenomena, and further described "rushes" (a tingling pleasant sensation suddenly rushing through the body) which were extremely reminiscent of cephalic auras. These rather indescribable sensations would arise either in the legs or abdomen and flood through the chest, neck and head and last for a few seconds, and also were associated with a feeling of being "stoned". They were frequently associated with a change in position, such as lying down or, less often, with standing up. She felt that the hallucinations were related to meals in that dietary restriction or delay in getting meals seemed to promote their appearance. They could be exacerbated by hyperventilation.

These hallucinations were experienced during the intervals *between* episodes of actual drug usage and occurred days, weeks or months after taking the hallucinogens. They had not preceded the use of drugs.

On neurological examination there were no definite abnormalities. Nystagmus occurred on extreme lateral gaze and was interpreted as "positional". The visual fields and ocular fundi were normal. The reflexes in the upper extremities were very hypoactive but symmetrical; those in the lower extremities were brisk and symmetrical. The gait and stance were normal. She hopped well on either foot.

There was no history to suggest a reason for any type of seizure activity. The patient was the first of two children and was delivered as a breech presentation but otherwise normally. She had no history of central nervous system infection or head injury.

On April 6, 1970, the patient was given chlorpromazine 25 mg., three times a day, with moderate diminution in the intensity, frequency and affective component of her flashbacks. "Big hallucinations" continued to occur but were less terrifying. On April 17 the chlorpromazine was discontinued and the patient reported an exacerbation to the previous level of "flashbacks" within 24 hours. Forty-eight hours after discontinuing chlorpromazine, diphenylhydantoin (Dilantin) therapy was instituted in a dosage of 100 mg. three times daily. The patient was not informed of the nature of the medication or of its possible effects. Within 48 hours she noted a very marked reduction in all types of "flashbacks", a complete disappearance of big ones and a reduction of the little ones to a barely discernible level. This situation has been maintained for over eight months. Diphenylhydantoin was discontinued in July with no exacerbation of flashback symptoms.

Comment

1. These recurrent "flashback hallucinations" were characterized by both a paroxysmal onset and termination and lasted anywhere from a few seconds to two minutes. Thus, they strongly suggested epileptic-type discharges. The *"déjà vu"* and "rushes" (?cephalic auras) are consistent clinically with seizure activity arising from the temporal lobe, the well-formed visual hallucinations from a posterior temporal location, and the "little hallucinations" from occipital or occipitotemporal foci.

2. Conventional electroencephalography did not demonstrate definite epileptogenic activity. The initial record on May 15 disclosed diffuse low voltage 12-15 cps activity associated with poorly formed theta and sharp wave activity. With hyperventilation some irregular slow activity was present in the left temporofrontal region and spikes appeared on two occasions. The second EEG was performed on June 26 while the patient was still on diphenylhydantoin therapy. It also showed scattered diffuse theta activity, more on the left and more prominent in the frontal regions, with superimposed fast activity. Poorly developed alpha rhythm was also seen. No correlation was present between numerous clinical "rushes" and electroencephalographic activity. The final record on November 12, after the patient had been off anticonvulsant medication for three and a half months, showed similar but less prominent abnormalities than were present on the June 26 record and was considered by one reader as being possibly within the limits of normal.

3. The fact that the hallucinations did not reappear following the withdrawal of diphenylhydantoin is not particularly surprising. The literature[1, 4, 12] would suggest that the phenomenon of flashbacks is a self-limited process.

4. That these flashback phenomena are epileptic in nature is, of course, not precluded by the lack of a clear-cut epileptogenic EEG focus, even more particularly when sphenoidal or pharyngeal recording leads were not used and while the patient was on anticonvulsant medication. On the other hand, the clinical history and the response to diphenylhydantoin therapy strongly suggest that in this patient the hallucinations represented cerebral seizure activity. With the full realization that a single case does not prove a general point, this particular case is presented to *raise the possibility* that hallucinatory flashback phenomena resulting from the use of hallucinogenic drugs may represent seizure activity, and that anticonvulsant medication may be of value in their management.*

References

1. HOROWITZ MJ: Flashbacks: recurrent intrusive images after the use of LSD. *Am J Psychiatry* 126: 565, 1969
2. FROSCH WA, ROBBINS ES, STERN M: Untoward reactions to lysergic acid diethylamide (LSD) resulting in hospitalization. *N Engl J Med* 273: 1235, 1965
3. COHEN S: Lysergic acid diethylamide: side effects and complications. *J Nerv Ment Dis* 130: 30, 1960
4. FISHER DD, UNGERLEIDER JT: The therapy of untoward LSD reactions. *Curr Psychiatr Ther* 8: 110, 1968
5. COHEN S, DITMAN KS: Prolonged adverse reactions to lysergic acid diethylamide. *Arch Gen Psychiatry* 8: 475, 1963
6. COOPER HA: Hallucinogenic drugs. *Lancet* 1: 1068, 1955
7. ROSENTHAL SH: Persistent hallucinosis following repeated administration of hallucinogenic drugs. *Am J Psychiatry* 121: 238, 1964
8. ELKES C, ELKES J, MAYER-GROSS W: Hallucinogenic drugs. *Lancet* 1: 719, 1955
9. ALLEN TE, AGUS B: Hyperventilation leading to hallucinations. *Am J Psychiatry* 125: 632, 1968
10. KEELER MH, REIFLER CB, LIPTZIN MB: Spontaneous recurrence of marijuana effect. *ibid:* 140
11. LOURIA DB: Lysergic acid diethylamide. *N Engl J Med* 278: 435, 1968
12. SMART RG, BATEMAN KC: Unfavourable reaction to LSD: a review and analysis of the available case reports. *Can Med Assoc J* 96: 1214, 1967
13. AGHAJANIAN CK, BING OH: Persistence of lysergic acid diethylamide in the plasma of human subjects. *Clin Pharmacol Ther* 5: 611, 1964

*One of the investigators has recently terminated a flashback which included visual hallucinations while the flashback was in progress, by giving 100 mg. of diphenylhydantoin (Dilantin) intravenously. He had previously injected saline as a "control" with no effect.