PATTERNS OF BEHAVIOR DISTURBANCE FOLLOWING CATARACT EXTRACTION [1]

LOUIS LINN, M.D., ROBERT L. KAHN, PH.D., ROBERT COLES, M.D., JANICE COHEN, B.A., DOROTHY MARSHALL, R.N., EDWIN A. WEINSTEIN, M.D.

INTRODUCTION

Behavior disturbances following cataract extraction have been described since the early nineteenth century. Most case studies have dealt with gross psychotic phenomena. In general, they emphasized the transitory nature of the changes, noting their occurrence primarily following operation when both eyes were bandaged, and their disappearance when the bandages were removed(1, 2, 3, 4, 5, 6). However, cases have been reported in which the disturbances did not subside with removal of bandages(7) and others have described psychotic reactions that appeared in spite of the fact that the eyes were not bandaged postoperatively(8, 9). A few authors carried out experiments to evaluate the specific role of eye covering by bandaging the eyes preoperatively(1, 4, 10), or placing patients in a darkened room(11), and found that acutely disturbed behavior could be provoked by such procedures. Aging or senile encephalopathy have been frequently mentioned as etiologic factors(1, 2, 3, 4, 7, 12, 13, 14, 15), as well as the presence of premorbid personality disturbances(2, 8) and the effect of drugs(8, 11, 12).

Systematic investigation of the phenomena has apparently not been carried out. It is our purpose to determine (1) the incidence and patterns of disturbed behavior following cataract extraction, and (2) some of the factors involved in producing the disturbed behavior, specifically the importance of the exclusion of visual stimuli, the role of organic brain disease, age, and premorbid patterns of behavior.

MATERIAL AND METHOD

Twenty-one unselected patients with bilateral senile cataracts were studied on the ophthalmologic ward service of the Mount Sinai Hospital.

Because disturbed behavior frequently was transitory or occurred only at night, each patient was observed constantly by one or more members of the staff. Information concerning the patient's premorbid personality was obtained in interviews with the patient, members of the family, and friends, and, in a few instances, from social service departments of other institutions.

On admission, each patient had an electroencephalogram and an "amytal test"(16) to determine the presence and degree of organic brain disease. The amytal test consisted of an intravenous injection of amobarbital sodium at the rate of 50 mgs. per minute until the patient showed marked nystagmus, dysarthria, drowsiness, and made errors in counting backwards. At this time the patient was asked a standard series of questions to test orientation for place, time, person, and awareness of illness. It was found that only patients with organic brain changes showed persistent disorientation or denial of illness under amytal when such behavior was not present prior to the injection.

The patient's eyes were covered shortly after supper, around five o'clock, on the night preceding the operation. At 11:00 p.m. the patient was awakened and orientation tested. The next morning after breakfast his eyes were uncovered and he was again interviewed. The purpose of this procedure was to determine the effect of simple masking on behavior, as contrasted with the postoperative period of masking when additional factors are involved.

Cataract extraction was carried out under local anesthesia in all but one patient who received a general anesthetic. Postoperatively the patients received, as indicated, codeine or demerol for pain and barbiturates for sleeplessness. The unoperated eye was uncovered on the third postoperative day, unless earlier uncovering became necessary because of increasing restlessness. During the periods of masking, both before and after the operation, side rails were applied to the bed.

[1] From the Departments of Psychiatry, Neurology, and Ophthalmology, of the Mount Sinai Hospital, New York City.

RESULTS

Twenty of the 21 patients showed some alteration of behavior during the period of hospitalization, such as changes in mood, psychomotor disturbances, delusions, hallucinations, disorientation and confabulations. The patterns of behavior may be conveniently described in relation to the time of occurrence; on admision, preoperative masking, postoperative masking, and the postoperative period after the eyes were unmasked.

BEHAVIOR ON ADMISSION

On admission the overt behavior of most patients was friendly and cooperative, with no indication of disturbance. During the psychiatric interview, however, patients expressed anxiety concerning the insecurities of old age, the difficulties associated with the progressive diminution in vision over a period of months and years, and fear of blindness. They spoke of such problems as the inability to work and take care of themselves, the need to depend on others for financial support, and loneliness occasioned by the death of contemporaries, particularly a husband or wife. Several complained of difficulty in memory.

Almost all expressed some anxiety concerning the forthcoming operation. However, this anxiety was manifestly severe in only 3 patients. It was expressed as a fear of blindness, of death during the operation, and a fear that both eyes would be operated on. Others denied that they were concerned. One expressed it thus, "If I die, I die. What difference will it make?" Several patients reacted to the frequent interviewing and questioning with hostility and expressions of concern about their sanity. Only one patient was grossly disturbed on admission. He was disoriented for time, place, and person, gave numerous confabulations, was irritable and uncooperative.

BEHAVIOR ACCOMPANYING PREOPERATIVE MASKING

Twenty of the patients were masked for a minimum of 12 hours during the night preceding the operation. Of these, 10 showed no observable disturbances; ten exhibited disturbed behavior ranging from insomnia and verbal expressions of anxiety to acute panic reactions. One patient in a severe panic state, associated with weakness, dizziness, and sweating, similar to claustrophobic attacks he frequently experienced prior to admission, expressed the dread conviction he would never see again. In 3 cases the anxiety became so great that the mask had to be removed; the disturbed behavior then subsided. In 2 of these the mask was then replaced; in 1 there was recurrence of anxiety. The patient who was grossly disoriented and disturbed on admission became even more disturbed and tried to climb out of bed. Five patients expressed particular concern about the side rails that were placed on their beds during the period of masking. One patient said, "I feel imprisoned. No one cares for me." Three expressed fear of wetting or soiling the bed if the nurse or orderly did not respond in time to their calls.

POSTOPERATIVE BEHAVIOR WITH EYES MASKED

During the 3-day period of postoperative masking, 18 of the 21 patients showed some noticeable alteration in behavior. In five cases this was mild. Thirteen showed severe behavioral disturbances, as determined by the criteria of persistence, intensity, and the presence of delusional trends. The reaction was considered persistent if it lasted more than 1 day, and intense if it was readily apparent. Eight of the 10 patients who reacted with some disturbance to preoperative masking were among the severely disturbed following the operation, while only 4 of the 10 who had no observable disturbance on preoperative masking became severely disturbed postoperatively. The patterns of behavior disturbances were varied.

(1) *Psychomotor Disturbances.*—The most common change was increased psychomotor activity, shown by 9 patients in whom there was restlessness, tearing off the mask, and attempting to climb over the side rails. One patient became violent and struck himself repeatedly about the head. Another was noisy and abusive.

(2) *Paranoid Delusions.*—Six patients manifested paranoid delusions. They said they were in a prison and demanded to be

released. Several thought they were being punished. One patient thought he had been pulled off the street into the hospital. One said her purse was stolen, another that she had been forced to inhale poisonous fumes.

(3) *Somatic Complaints.*—Four patients had somatic complaints but in only one did it concern the eyes. This patient was convinced that her eyes had been enucleated. She denounced her daughter bitterly for making her undergo surgery, although the operation had actually been carried out at the patient's insistence and against the daughter's wishes. Another thought he hadn't had a bowel movement in 3 months and wanted to know why something wasn't done about it. In 2 cases there was an extreme hypochondriacal reaction.

(4) *Elation.*—Four patients showed elation during the postoperative period, characterized by high-spiritedness, talkativeness, ravenous eating, and jocularity. One patient said she had been to a ball the night before; another accounted for an episode of disorientation by saying, "Maybe I drank too much whiskey."

(5) *Hallucinations.*—Visual hallucinations were present in 3 cases. One depressed patient said he could see a large bottle of iodine, which he insisted that the nurse give him. Two patients hallucinated that people were standing in front of them. One maintained a cheerful, muttering conversation with these "people." Two complained of being behind a closed door. One said on one occasion, "I'm covered with layer upon layer of beautiful lace"; at another time she thought she was in a "strange room filled with enameled human figures that were unfriendly." She also thought she had been moved to a "brown" room, then to a "blue" room.

Two patients experienced auditory hallucinations or misinterpretations of noises that followed a pattern which we called the "delusion of violence in the street." Thus, one said he had been kept awake all night by sounds in the street of people being robbed, shot, beaten, and run down by automobiles. He denied that he had been frightened, saying, "Why should I be? I was safe and sound in my bed in the hospital." The other patient just spoke of "terrible things" going on in the street during the night.

(6) *Disorientation.*—Eight patients showed some degree of spatial disorientation. In 6 this took the form of disorientation for place; 3 believed they were home, one that he was in another hospital, one that he was in an apartment house, and one that he was at his place of business. In 4 patients there was topographical disorientation, referring to change of position of the beds on the ward. Thus, 1 patient complained that her bed had been moved to the opposite wall, another said with considerable anxiety that her bed had been moved out into the yard. After unmasking, when she became oriented she said, "It feels good to be back in my own bed again."

Four patients exhibited some temporal disorientation. One mistook a morning for an afternoon and confabulated that lunch had been offered to her but she refused it. Two others asked for breakfast or a shave in the middle of the night. One man kept asking the time because, as he said, he "did not want to lose this point of contact." Three patients denied that they had been operated on. In 2 this was accompanied by disorientation for place and the other was incontinent of urine.

(7) *Anxiety.*—Two patients displayed primarily an increase in anxiety. One became sullen and resentful, bitterly protested the side rails, and expressed great fear of blindness. He was obsessed with the fear that if the operation failed and he became blind, his wife would no longer take care of him. The other asked repeatedly that the mask be removed so that she could see her husband.

Almost all patients exhibited more than one of the patterns of behavior disturbance, especially those with severe reactions. Frequently they were manifested simultaneously, in some cases increasing in severity on successive nights. Thus, 1 patient was restless on the first postoperative night and reported the "delusion of violence in the street." On the second night he had hallucinations that continued to be present the next afternoon. On the third night he tore off his mask, confabulated that his wife was upstairs, became aggressive, and expressed the paranoid delusion that he was being kept prisoner in an apartment house and demanded his release.

Disturbed behavior was evident as early as 1 hour postoperatively. In all but 2 cases signs of disturbances, if they appeared at all, were evident on the first night. In these 2 cases observable behavioral change was not present until the day after the operation.

In 3 cases acutely disturbed behavior seemed to subside when the patient was addressed by the nurse. In response to her voice, the patient would seem to be startled, and, for a time at least, would become more lucid. These patients spontaneously volunteered the information that they felt as if they had been "awakened from a dream."

BEHAVIOR AFTER UNMASKING

Six patients showed marked improvement in their behavior as soon as the mask was removed. In 1 a severe hypochondriacal reaction was replaced by an elation during which the patient insisted that her vision was greatly improved. This lasted for 2 days, following which there was some return of hypochondriacal behavior. Three patients showed improvement in 48 hours. One patient showed immediate improvement, although she continued for 2 more nights to have episodes of feeling that her bed had been moved. In another the acutely disturbed behavior persisted for 13 hours following unmasking. The patient then fell asleep and woke up 3 hours later in remission, although he later showed transitory paranoid ideation. In 1 instance the delusion that the bowels were obstructed continued for 1 day after the mask was removed, but subsided when the patient became ambulatory.

In 4 patients behavioral disturbances persisted long after unmasking. Each of these patients had some grossly evident physical complication. One developed bronchopneumonia and continued to be disoriented until his medical condition improved. A patient with advanced alcoholic cirrhosis developed severe apnea during his operation and for a time was critically ill. He showed incontinence, lethargy, and intermittent denial of his operation until he was discharged. He showed transitory periods of lucidity that increased in length as his general condition improved. One man who had been grossly disturbed on admission continued to be so throughout his hospitalization, although his disturbance was more marked during the postoperative period of masking. The fourth case showed a disturbed reaction to medication which will be described more fully later.

Two patients exhibited disturbed behavior that was most marked following removal of the mask. One expressed the "delusion of violence in the street." Eight hours after his eyes were unmasked he thought he was out in the street, that a war was in progress, planes were rushing about dropping bombs and setting fires, and trains were roaring up and down. There was a riot and people were panic stricken trying to escape. When a nurse spoke to him reassuringly his panic subsided as quickly as it began. One patient, who had shown intense anxiety postoperatively, became panicky 10 hours after removal of the mask, thinking that her tongue was shrunken, that she was poisoned, and that she was going to die. This episode lasted 2 hours. She fell asleep after intramuscular injection of sodium phenobarbital and showed no disturbance on awakening the following morning. She reported the incident of the previous night as a dream and added that she had been a poor sleeper for years, subject to frequent nightmares at home.

Four patients became depressed postoperatively when their discharge from the hospital was delayed by ophthalmologic complications. One reproached himself repeatedly for having submitted to surgery. He would strike himself on the head for having been "such a fool." He had transitory paranoid ideas about the doctors, saying that all he needed was a pair of glasses and not an unnecessary operation. One patient who was depressed on admission, and developed the delusion during the immediate postoperative period that his bowels were "clogged up" in spite of repeated successful enemas, continued to be depressed when unmasked, and several weeks after his discharge committed suicide.

BEHAVIOR IN RELATION TO THE EEG AND AMYTAL FINDINGS

Eighteen of the 21 patients had either an abnormal EEG record or an abnormal amytal response or both. In 11 cases the EEG was abnormal.[2] The incidence of abnormal records in the cataract patients was much higher than in a group of patients of comparable age without cataracts. The amytal test was given to 19 patients and was abnormal in 13. In 6 cases both tests were abnormal and in 3 both were negative. In 3 cases the EEG was abnormal and the amytal test negative, while in 7 cases the amytal test was abnormal and the EEG normal. In 2 cases no amytal was given but the EEG's were abnormal.

It is clear that abnormal function on 1 test did not necessarily imply abnormality on the other. Seemingly, both tests measure different aspects of brain function. However, all patients in whom *both* tests were abnormal showed particularly disturbed behavior during preoperative masking and severe reactions following the operation. Of the 3 patients in whom both tests were negative 1 showed no observable behavior disturbance at any time during his hospitalization, 1 had a mild disturbance, and the third showed a severe hypochondriacal reaction during the postoperative period of masking.

BEHAVIOR IN RELATION TO AGE

The patients ranged in age from 45 to 85. The median age was 75, and all but 3 patients were at least 70 years old. Of the 11 who were 75 or older, 10 showed severe behavioral disturbance. On the other hand, only 3 of the 10 patients under 75 exhibited such reactions. This correlation between age and behavioral disturbance may be accounted for theoretically by the assumed brain changes with advancing years. This is substantiated, in part, by the fact that all 6 of the patients with both abnormal EEG's and amytal responses are found in the older age group. However, 4 of the 5 remaining older patients showed severe disturbance which is a greater proportion than found in the younger group.

BEHAVIOR IN RELATION TO SEX

Of the 21 consecutive admissions to the hospital, 11 were male and 10 female. Seven of the male patients and 6 of the female showed severely disturbed behavior. Though the number is small, there appears to be no relationship between behavioral disturbance and sex.

BEHAVIOR IN RELATION TO DRUGS

Since disorientation was produced in several patients preoperatively by intravenous administrations of amytal sodium it could be expected that similar drugs given in the postoperative period for pain and restlessness might be a factor in the production of abnormal behavior. It should be pointed out however that the intravenous dose for the amytal test was 0.3 to 0.5 gm.; whereas the postoperative dose of amytal given by mouth was never higher than 0.25 gm. Furthermore, abnormalities in behavior often subsided despite continued administration of amytal. One patient received only a single 50-mgm. dose of demerol immediately postoperatively yet exhibited psychotic behavior for 3 days, a period far outlasting any possible effects of the drug. On the other hand, the one patient who showed no disturbed behavior throughout his entire hospital stay, had repeated doses of amytal sodium and demerol for 8 consecutive days following the operation. In only 1 case was there a clear relationship between the effect of drugs and disturbed behavior. This patient shouted obscene language and had hallucinations concerning dead relatives for 6 days following the postoperative removal of the mask. When his medication, consisting of amytal, phenobarbital, and chloral hydrate was discontinued, he improved promptly and his behavior returned to normal in 36 hours. Six months previously he had had a similar episode following a prostatectomy which likewise subsided when sedative medication was discontinued.

ROLE OF THE PREMORBID PERSONALITY

Several of the patients employed defense mechanisms in the stress situation of the hospital similar to those they had been accustomed to using in dealing with problems in the past. Thus, one patient who was affable and ingratiating on admission became hostile and suspicous after the mask was applied. In his personal history he showed this same pattern, namely, a capacity to make a superfi-

[2] EEG records were read by the staff of the EEG Laboratory; Drs. H. Strauss, M. Ostow, L. Greenstein. The EEG data will be the subject of a separate detailed report.

cially friendly impression that gave way to a hostile paranoid reaction as soon as relationships became more complicated. Two patients who were extremely restless and sleepless during the preoperative masking said the next day that they hadn't been upset. In their personal history one could find the same tendency to use denial, to minimize the severity of the hardships and frustrations to which they were exposed.

The mask was often applied early in the evening while the patient was still sitting up in the day room. One patient reacted with the agoraphobic-like panic already referred to. He asked to be led to his bed. Once safely in bed his panic subsided as long as a nurse sat by his side. Here the defense was a type of regression. His use of this defense was even more striking during the postoperative period of masking when his reaction was one of euphoria. He talked volubly and laughed readily. He consumed great quantities of food with many expressions of pleasure. He said that this was the first real vacation of his life. He compared the comforts and conveniences of his stay in the hospital with that of a guest at a fancy resort. The anxiety he displayed preoperatively was entirely gone. No longer was there a fear of blindness. On the contrary, with the regression there seemed to be a joyous surrender to the helplessness and passivity which the postoperative period of blindness forced upon him. In his personal life the patient was a passive, dependent individual, frequently given to temper tantrums whenever he felt that his wife was not taking proper care of him. When the mask was removed and the day of his discharge approached, his elation subsided and in its place anxiety and depression appeared.

One patient, given to hypochondriasis all her life, displayed an extreme intensification of her physical complaints during the postoperative period of masking. When the unoperated eye was uncovered, the hypochondriasis subsided completely. Indeed, with the restoration of vision she became elated, and insisted that her vision was much improved over her preoperative status, a manifest impossibility since she was using the unoperated eye at this time. In 2 days the elation and the "delusion" of improved vision subsided. She became hypochondriacal again, although never to the same extent as during the postoperative period of masking. It was also interesting that she never referred to her eyes in her multitude of complaints. This was also true of 3 other patients, in all of whom somatic complaints were the central feature of their postoperative behavioral disturbance.

Discussion

According to previous reports the incidence of disturbed behavior following cataract extraction in senile patients is about 3%(2, 3, 7, 12, 14, 17) although Finlay (18) reported only 1 case in a series of 294. In the present study, however, 20 of the 21 patients, or 95%, showed some alteration in behavior during the period of hospitalization, and 13 patients, or 62%, showed severely disturbed reactions following the operation. This marked difference reflects primarily a difference in the method of observation and the criteria of disturbed behavior. By planned observation of all patients on a 24-hour basis, and with daily interviewing, it was possible to perceive disturbances in behavior that might otherwise have been missed. Many times disturbances occurred at night or for transitory periods when only nurses were present. For this reason their observations were of great importance. Often alterations in mood or the presence of unexpressed delusions or hallucinations were elicited by daily questioning.

The factor of organic brain disease may be of critical importance in explaining the high incidence of psychopathology in the group. This appears to be substantiated by the fact that the most severe disturbances were found in those patients in whom both the amytal test and the EEG were positive for organic brain disease. The 1 patient in our series who displayed no observable abnormality in behavior during hospitalization was one of a group of 3 who had a negative amytal test and a normal EEG. The fact that 18 of the 21 patients had some evidence of organic brain disease suggests that senile cataract may be 1 manifestation of a more extensive degenerative process.

Organic brain disease can influence the nature of the defense mechanisms, involving such factors as the rigidity and duration of the disturbance. For instance, one patient stated that she went out to a dance for a good time. When the examiner indicated doubt, she said, "I say this because it is better to joke than to be sick." She promptly corrected errors by saying, "At my age I have a right to be mixed up a bit," and chuckled if she addressed the examiner by the wrong name. The organic factor in this case was not marked, as the negative amytal test and the mild EEG disturbance showed. Had the disturbance in brain function been greater, she probably would not have been able to correct the error, and the joking would become a "real" psychotic experience and would then be classed as a confabulatory delusion.

One patient, for example, had both a positive amytal reaction and a marked disturbance in the EEG. This patient reacted to the postoperative period of masking with euphoria and a multitude of gaily colored hallucinations. The psychotic period was filled with material from her school days as a young woman in Germany. In the psychosis she was able to "see," she was young and carefree again. In short, she was able to deny the disagreeable realities of her current existence.

Some of the patients with spatial disorientation spoke directly of having difficulty in remembering where and how they were situated. Their experiences are reminiscent of those described by Cameron(19) in a group of senile patients who tended to become delirious at night. The patients were asked to point out, with eyes open, the location of 5 common objects in the room. They were then blindfolded and asked every 15 minutes for 1 hour to point out the location of the objects. In 13 of the 16 patients, definite displacement occurred. In some, the distortions in recall were such that the surroundings came to resemble more and more the patients' own homes.

The role of covering the eyes and of darkness in general in eliciting psychotic behavior in patients with organic brain disease is a complex one. The perceptions of the outer world not only remind these forgetful patients of their whereabouts but arouse them to a state of greater alertness. This was seen on several occasions when disturbed patients became momentarily more rational when spoken to. Paradoxically the same intense scrutiny that made possible the discovery of an unsuspectedly high incidence of disturbed behavior may, by its arousing effect, have reduced the amount of disturbance that would otherwise have occurred. A third, and probably the most important effect is its influence on anxiety. The familiar sights and sounds of ward activity are reassuring to the patient, and conversely, darkness and silence are frightening, particularly in these patients in whom fear of blindness is so prominent.

Although preoperative bandaging aroused considerable anxiety in several of our patients, in no case did it result in psychotic phenomena like those observed postoperatively. The time element may provide at least a partial explanation for this difference. Although most of the disturbances in postoperative behavior occurred by the first night, it was often found that on succeeding days it was of progressively greater severity. In other studies(7, 10, 11, 14, 20) the most frequent time of onset was on the second day. Gat and Orban(10) found that their patient had to be in darkness for about 24 hours before psychotic symptoms became manifest. It is possible that if the preoperative masking had been continued for a longer time, more varied and more intense disturbances might have occurred.

However, other factors are of great importance in producing the disturbances of behavior. The physical and psychological stress of the operation itself, the postoperative pain, the limitation of mobility, the presence of the side rails and the uncertainty about the outcome are additional sources of anxiety, and make the postoperative period a particularly stressful one.

Two patients showed disturbances in behavior for the first time during the postoperative unmasked period. In these cases the problems associated with leaving the hospital were perhaps more disturbing than the operation itself or the bandaging of the eyes. To some extent, and to some patients, the stay in the hospital was a temporary respite from problems confronting them on the outside. Their physical needs were provided for, financial worries were not an immediate problem, and they were subject to the increased interest and sympathy of friends and relatives. In such a situation, it is understandable that the prospect of leaving the hospital may precipitate acute anxiety or depression and result in various disturbances of behavior.

The role of age is also complex. Apart from the factor of organic brain disease which is likely to be more marked in the older patients, psychological problems may also become more severe with advancing age, because of economic insecurity, loneliness, increased helplessness due to physical and mental infirmities, as well as diminished capacity to deal flexibly with anxiety-provoking situations. Our cases were ward patients, drawn largely from a home for the aged, and therefore the foregoing factors may have been particularly marked in this group.

In view of the almost universal occurrence of behavior disturbances in our cataract patients we believe we are justified in stating that the premorbid personality may have determined some of the elements or qualitative aspects of their disturbances but could not account for their vulnerability as a group.

The disturbances in behavior appear to represent, in part, a symbolic manifestation of a drive to deny illness, although only 3 patients showed explicit verbal denial. The hypochondriacal reaction may be interpreted as a form of partial denial. The patient acknowledges that he is ill, but says in effect that his illness is not blindness, which is dreaded, but constipation, etc., to which he is accustomed and which he has overcome many times in the past. It has also been noted in patients with organic brain disease that the major aspect of illness may be denied while the patient complains of a minor one(21).

Some of our patients displayed paranoid reactions. Here, as in the hypochondriacal reactions, the patient acknowledges that he is ill. This time, however, he reassures himself with the thought that his difficulties do not arise from within himself, but are rather the result of the machinations of others. One patient, for example, not only complained bitterly of constipation but insisted that the orderly who gave him enemas was inept and unkind. There was some evidence of recent overt homosexuality in the history. The constipation as a symptom could be conceived in terms of Freudian theory as an invitation to homosexual attack, while the paranoid attitude towards the attendant who gave the enema seemed to represent an attempt to defend himself against this unconscious wish. In this particular case, the hypochondriasis and the paranoid reaction seemed in addition to defend him against a severe depression that he had on admission. After his unoperated eye was uncovered and he became ambulatory, his complaints of constipation and ill-treatment by the attendant disappeared. With this his depression reappeared and resulted in his death by suicide several weeks after he was discharged.

The fact that the visual system was rarely specifically referred to in the patient's productions might indicate that the behavior is a total reaction to the threat of destruction or incapacity in addition to being a denial of poor vision.

Patients have been known to injure themselves gravely or to commit suicide during psychotic reactions following cataract extraction. In view of the aging population with its increasing incidence of cataracts the matter of prophylaxis is important. For example, if a patient has a positive amytal test and an abnormal EEG and develops considerable anxiety on preoperative masking, the likelihood of a severe disturbance postoperatively is rather high. One might want to single out such patients for particularly attentive postoperative care. The removal of side rails where the nursing situation permits may be of value, as well as the presence by the bedside of solicitous friends and relatives. Whereas adequate medication for pain is desirable, restlessness would be better treated not by sedation but by uncovering the unoperated eye. This should be done at the first sign of growing restlessness even if it is only a few hours following the operation. The surgical risks of early unmasking may be less than those of a psychotic outbreak. Early sitting up in a chair and early ambulation appeared to have a beneficial effect on the behavioral status of these patients. There are numerous references in the literature(22, 23) to the beneficial effect of early return home, especially in cases where the disturbance began in the hospital and did not subside after unmasking(9).

Summary and Conclusions

1. Twenty-one consecutive ward patients admitted to the ophthalmologic service for

senile cataract extraction were studied by a team of observers. Each patient was given an EEG and an amytal test for organic brain disease. Prior to operation each patient was masked for a period of at least 12 hours.

2. One patient was manifestly psychotic on admission. The others showed varying degrees of anxiety that could be related largely to insecurities attendant on old age and loss of vision. The preoperative masking produced changed behavior in 10 patients, ranging from insomnia and verbal expressions of anxiety to acute panic reactions. Removal of the mask relieved the anxiety.

3. Following the operation 20 patients showed some alteration in behavior including changes in mood, psychomotor disturbances, paranoid and somatic delusions, hallucinations, disorientation and confabulations. In 13 cases the disturbance was characterized as severe. Unmasking resulted in prompt improvement in 6 cases, gradual improvement in 48 hours in 3. Only 4 patients continued to show disturbances after the mask was removed; in each some physical complication was present. In 2 patients abnormal behavior appeared for the first time after unmasking.

4. Some degree of organic brain disease, as shown by the EEG and amytal test, was present in 18 patients. There appeared to be a relationship between the presence and degree of brain damage and the development of disturbed behavior. The findings suggested that senile cataract may be one manifestation of a more extensive degenerative process. Older patients are more apt to show disturbances. The premorbid personality pattern seemed to be unrelated to the incidence of altered behavior, but to some extent determined the particular type of pattern exhibited.

5. It is concluded that disturbed behavior is an integral part of the reaction of almost all cataract patients because of a complex interaction of a number of factors. The implication of these findings for prophylaxis and management is discussed.

BIBLIOGRAPHY

1. Sedan, J. A propos du delire post-operatoire en ophtalmologic. Rev. d'oto-neuro-opht., **17**: 168, 1939.

2. Preu, P. W., and Guida, F. P. Psychosis complicating recovery from extraction of cataract. Arch. Neurol. & Psychiat., **38**: 818, 1937.

3. Greenwood, A. Mental disturbances following operation for cataract. J.A.M.A., **91**: 1713, 1928.

4. Schmidt-Rimpler, H. Delirien nach Verschluss der Augen und in dunkeln Zimmern. Arch. f. Psychiat., **9**: 233, 1878.

5. Sichel, J. Sur une espece particuliere de delire senile qui survient apres l'extraction de le cataracte. Ann. d'Ocul. Par., **49**: 154, 1863.

6. Pfingst, A. C. Acute delirium following cataract extract operation. Case report. Kentucky M. J., **21**: 99, 1923.

7. Posey, W. C. Mental disturbances after operations upon the eye. Ophth. Rev., **19**: 235, 1900.

8. Butler, T. H. Insanity after eye operations. Tr. Ophth. Soc. U. Kingdom, **40**: 363, 1920.

9. Kipp, C. J. Mental derangement which is occasionally developed in patients in eye-hospitals. Arch. Ophth., **32**: 375, 1903.

10. Gat, L., and Orban, L. Nach Staroperation Auftretende Delirien. Ophthalmologica, **112**: 335, 1946.

11. Boyd, D. A., and Norris, M. A. Delirium associated with cataract extraction. J. Indiana M. A., **34**: 130, 1941.

12. Parker, W. R. Postcataract extraction delirium: Report of eleven cases. J.A.M.A., **61**: 1174, 1913.

13. Weeks, J. E. Mental disturbance following operation for cataract. J.A.M.A., **91**: 1713, 1928.

14. Brownell, M. E. Cataract delirium: A complete report of the cases of cataract delirium occurring in the ophthalmologic clinic of the University of Michigan between the years 1904 and 1917. J. Michigan Med. Soc., **16**: 282, 1917.

15. Harbridge, D. F. Senile cataract extraction followed by certain complications. Ann. Ophth., **23**: 58, 1914.

16. Weinstein, E. A., et al. The diagnostic use of amobarbital sodium in organic brain disease. Am. J. Psychiat., in press.

17. David, M. V. Le delire post-operative chez les operes de cataracte. Ann. d'Ocul. Par., **143**: 79, 1910.

18. Finlay, C. E. Delirium after eye operations. Arch. Ophth., **33**: 5, 1904.

19. Cameron, D. E. Studies in senile nocturnal delirium. Psychiat. Quart., **15**: 47, 1941.

20. Thomas, F. C. Delirium following cataract extraction. Kentucky M. J., **24**: 134, 1926.

21. Weinstein, E. A., and Kahn, R. L. Syndrome of anosognosia. Arch. Neurol. & Psychiat., **64**: 772, 1950.

22. Bruns, H. D. On the ambivalent after-treatment of cataract extraction with a note on postoperative delirium and on striped keratitis. Ann. Ophth., **25**: 718, 1916.

23. Bailey, F. W. Cataract operations performed upon patients in their own beds. J. Iowa M. Soc., **18**: 8, 1923.