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WALTER R. PARKER, M.D.
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The first description of postoperative psychoses dates back to the sixteenth century when Para called attention to the occurrence of mental symptoms after operations. In 1819 Depuytren described a "delirium nervosum" which occurred in the first three days after an operation, and in 1842 psychoses after eye operations were reported by Sherzog. Sichel[1] in 1863 described a peculiar delirium which he had observed seven or eight times in the wake of cataract operations. All the patients were over 60 years old. He attributed it to sealing the lids and thought the mental effect similar to homesickness. Arlt[2] wrote in 1874:

> The second eye is uncovered before the fourth day only when the patient becomes restless because of darkness. In old patients, much run down, timid and nervous, mental disturbances may occur during the first few days after the operation.

I have been unable to find a classification from the standpoint of the psychiatrist. Evidently no single form of mental disturbance is characteristic of postoperative delirium. Hurd[3] would limit the cases to those clearly the result of infective processes, while Selberg,[4] in addition to infection, includes anesthesia, drugs, auto-intoxication, physical or mental exhaustion. Picque[5] eliminates cases due to alcohol, drug intoxication and septic infections. He employs the term only to designate those instances in which the trouble supervenes in a patient

* Read in the Section on Ophthalmology of the American Medical Association, at the Sixty-Fourth Annual Session, held at Minneapolis, June, 1913.

1. Sichel: Ann. d'ocul., 1863, xlix.
2. Arlt: Handbuch der gesamten Augenheilkunde (Graefe-Saemisch), 1874, iii, 309.
3. Hurd: Am. Jour. Obst., 1899, xxxix.
4. Selberg: Beitr. z. klin. Chir., 1904, xliv, 173.
5. Picque: Bull. et mém. Soc. de Chir., Paris, 1898, xxiv, 171.

not otherwise ailing. Burr[6] says that transitory confusion or delirium rarely occurs in the aged without the presence of severe arteriosclerosis and marked disease of the kidneys, even when the immediate cause is autointoxication from the intestines or stomach, or from some unknown endogenous source. He does not think the cerebral arterial disease is the cause of the attack, however, as practically all the aged have hardened arteries and may show no mental illness. These transitory attacks are not due to the fact that the thickened arteries do not carry enough blood to supply the brain, but are caused by a poison or poisons carried by the blood. Phillips[7] holds that in old age trivial causes may produce a wandering of the mind, due no doubt to the impaired nutrition of the nerve-cells from a diseased heart or sclerosed cerebral vessels. Gressinger, as quoted by Löwy,[8] advocates the theory that the causative factor for the origin of the psychoses lies in peripheral nerve injury or a disease of the sensory nerves originating peripherally from operative traumatism. Schultze[9] concludes that postoperative psychoses occur after all forms of operation but most frequently after "predisposed diseases." In a large number of cases a hereditary tendency is found. He agrees with Picque that definite cases of real postoperative psychoses, in contrast to the false postoperative delirium, are reduced to a small number. In the great majority of cases fever, lasting toxic condition after the operation, inanition and condition of weakness, the cause of which is to be sought in the underlying disease itself, offer the explanation for the oncoming condition of psychosis. Englehardt[10] concludes (1) that postoperative psychoses develop in individuals predisposed by heredity, chronic intoxication, grief or care; (2) that the weakness incident to the operation or disease preceding can scarcely be considered essential—at most it may be considered as the determining factor in predisposed cases, and (3) that there are cases of postoperative psychoses in which an etiologic understanding is not as yet accessible.

It has been contended that serious operations on the pelvis and genital organs and operations on cataracts

6. Burr: Transitory Mental Confusion and Delirium in Old Age, THE JOURNAL A. M. A., Dec. 30, 1911, p. 2118.
7. Phillips: Cleveland Med. Jour., 1909, viii, 531.
8. Löwy, Rudolph: Allg. Ztschr. f. Psychiat., 1896, lii, 166.
9. Schultze: Deutsch. Ztschr. f. Chir., 1910, civ, 584.
10. Engelhardt: Deutsch. Ztschr. f. Chir., 1910, lviii, 46.

were especially prone to be followed by mental disorders. While most of the cases of postoperative delirium have been reported by ophthalmologists and gynecologists, it is generally agreed that the character of the operation itself has little or no influence in inducing a postoperative psychosis. The hereditary predisposition of the patient, his habits as to alcohol and drugs, his physical, mental and moral qualities, his attitude assumed on entering the operating-room, effect of anesthetics, dressings and complications of the operation, such as infections, all have received consideration. The effect of the darkness of the room is important, as the delirium has been observed after the application of a bandage when no operation has been performed. Schmidt-Rimpler reports two cases of delirium following confinement in the dark room without operation, one, a case of syphilitic iritis, the other case of double iridochorioiditis, in a strong young man. From these two cases, he refers the controlling visual hallucination to the shutting off of the sight sense. In cases which do not show hereditary predisposition, complications of a septic or toxic nature, disturbance of kidney or liver functions, and in which history of alcoholism and hysteria can be eliminated, the operation itself and the subsequent treatment must be reckoned as etiologic factors. Krafft-Ebing long ago suggested the possibility of fright incident to the eyes being bandaged as the exciting cause of the delirium. That the "dark cure," however, is not responsible for all cases is proved by the fact that many patients show mental disturbance when the eyes are not bandaged. Urbach,[11] for instance, reports five cases of delirium occurring in 106 operations for gall-stones. Kelly,[12] Baldy[13] and others have reported gynecologic operations which were followed by mental disturbance and in none of them were the eyes bandaged.

From this incomplete list of published cases of postoperative delirium it will be seen that the writers are not agreed as to its etiology or classification. The prognosis is generally good. But here, again, much depends on the class of cases included in the report. The age of the patient is thought to be a most important factor. A few cases have been reported in patients below the age of

11. Urbach: Wien. klin. Wchnschr., 1907, xlvii, 1465.
12. Kelly: Surg., Gynec. and Obst., 1909, ix, 515.
13. Baldy: Am. Jour. Obst., 1891, xxiv, 1217.

60. The late onset and long duration of the mental disturbance are noticeable in these younger patients, and the prospect of recovery is not so favorable as in the old.

The cases here reported are from the ophthalmic clinic of the University of Michigan from 1908 to 1912, inclusive. The report includes cataracts of all kinds, occurring in the old and young. There are eleven cases of delirium in a total of 376 cataract extractions as shown in the accompanying table:

DELIRIUM FOLLOWING CATARACT EXTRACTION

	Patients Operated on				Patients Delirious			
	No.	Av. Age (Yrs.).	Youngest.	Oldest.	No.	Av. Age (Yrs.).	Youngest.	Oldest.
Males	233	62.35	2.5	90	7	74.28	69	80
Females	143	61.05	25	86	4	68	53	82
Total	376	61.07			11	65.71		

Following is a brief history of my cases of post-cataract extraction delirium:

CASE 1.—B. M. G., woman, aged 75. Urine examination negative. April 20, 1908, simple extraction. No accident. During the evening of the second day almost maniacal, becoming uncontrollable, up and down during the night; disoriented, auditory hallucinations; tore dressings from eyes several times; wound opened, no prolapse of iris. Left hospital with daughter on third day against advice. Anterior chamber filled with blood. Returned one month later for secondary cataract operation. Eye in perfect condition. No mental disturbance after reaching home.

CASE 2.—G. W. M., man, aged 71. Urine examination negative. Oct. 22, 1908, combined extraction; no accident. Two days later delirium developed; disoriented, out of bed, fell on floor, arose and walked about the ward, calling for wife and daughter, believing himself at home. Patient put back in bed, dressings removed from unoperated eye, given ice-cap and the situation explained. He soon quieted down. No recurrence. Operation surgically perfect.

CASE 3.—G. P., man, aged 81. Urine examination not recorded. Bothered with old cystitis, passing urine involuntarily. March 1, 1909, combined extraction. Patient very restless on operating-table. Second night delirious. Bandage removed from unoperated eye. Next day patient quiet. No subsequent attacks. Eye not damaged.

CASE 4.—M. C., woman, aged 82. Urine examination negative. April 29, 1909, combined extraction. No accident. First night patient nervous and restless, sat up on edge of bed; unoperated eye uncovered. Controlled with difficulty until the third day when she became disoriented with hallucinations.

Continued to have periods of disorientation until discharge on twelfth day. Eye not injured.

Case 5.—M. T., woman, aged 62. Blood and urine negative. Dec. 12, 1909, combined extraction. Next day patient became delirious, fairly well oriented but suspicious of those about her, garrulous, and not amenable to discipline. This continued until patient was discharged on the twelfth day. Operation surgically perfect. No further record.

Case 6.—B. S., man, aged 77. Urine negative, Aug. 15, 1910, combined extraction, given codein 1 grain. During evening of second day patient out of bed, talked incoherently, disoriented; given morphin sulphate ⅛ grain hypodermically, with little effect. Patient restless all night, out of bed several times. Following day thought he was in a barn, but did not know doctor or nurse, refused to go back to bed. Anterior chamber filled with blood. Given morphin ¼ grain. Slept during part of the day. Fifth day increased restlessness all afternoon. He knew he was in a hospital but thought his son was in a near-by bed, and had been subjected to an operation. This condition continued until the tenth day when he became oriented and quiet. Result of operation perfect.

Case 7.—F. K., man, aged 80. Urine normal. May 1, 1911, combined extraction. On following day became delirious. Out of bed twice, tore pads from both eyes. Played with loops and picked at bed-clothes. Given veronal without effect. Up and walking about during the night. Could not be induced to go to bed; highly excited, talked incoherently. Violently resisted any attempt to put him back to bed. Tried to escape from room by pushing doctor and nurse aside. Repeatedly tore pads from eyes. Given scopolamin 1/1000 grain. After half hour slept for six hours. Constantly confused and disoriented until discharged on eighteenth day. Eye not injured. No subsequent record obtained.

Case 8.—M. C., man, aged 70. Urine examination negative. Oct. 15, 1911, combined extraction. At midnight of second day after operation he became confused, tore bandages from his eyes and wandered about the room. Was quieted by intern, became oriented, gave as excuse he had wakened suddenly and could not locate himself. Thereafter convalescence was uninterrupted. Eye not injured.

Case 9.—M. S., female, aged 53. No record of urine examination. Jan. 25, 1912, combined extraction. No accident; given codein 1 grain. Considerable reaction followed the operation. Patient was nervous and apprehensive but suffered no delirium until sixth day when she became disoriented and talked irrationally. Refused to eat, claiming food contained cut glass. Several times attempted to get out of the room and to go to see the doctor. Thought she heard some one calling her name. On the ninth day more quiet, but constantly watch-

ful, frequently asserting she might be harmed. Never again disoriented. Always knew the names of those about her. Auditory hallucinations continued until the time of discharge on the twenty-first day.

CASE 10.—M. E., man, aged 72. Urine examination negative. July 17, 1912, combined extraction without accident. During night of second day after operation patient became delirious; nurse unable to control him. Out of bed, disoriented, had hallucinations of hearing and talked in a rambling manner. Pad was removed from unopened eye. Later he became nauseated and vomited a small amount of undigested food. No signs of delirium followed. Eye not injured.

CASE 11.—M. S., man, aged 69. Urine negative. July 12, 1912, combined extraction. During afternoon of second day became delirious. During night much worse, with hallucinations of hearing and disorientation. Given morphin sulphate ¼ grain and tepid sponge bath; removed pad from unoperated eye. Later given 1/1000 grain scopolamin, after which he slept three hours. On waking the delirium was still marked. Next day he was quiet and had no return of delirium. Eye not injured.

It will be noted, in the cases here reported, that the psychoses occurred only in the aged, the youngest male affected being 69 years old, the oldest 80, average 74.28; the youngest female 53, the oldest 82, average 68 years of age. Males were more frequently affected than females, seven patients being men and four women.

The psychoses began from twenty-four hours to six days after the bandages were applied. In five cases the delirium occurred during the daytime, in six during the night, but in every case the symptoms were more prominent at night.

In no case did the patient show signs of deviation from a normal mental state, either before or at the time of operation. A general anesthetic was not administered. Four instillations of 4 per cent. solution of cocain were used at intervals of two minutes in each case. After operation the patients were quiet and tractable. Later they became restless, indifferent to precautions to remain quiet, often raised themselves without assistance, disturbed the bandages, etc. They usually answered questions rationally, but gave little heed to instructions. With some patients the first manifestations become more marked at night; they get out of bed, perhaps allowed themselves to be quieted for a short time, or became obstinate, scolded and defended themselves. The major-

ity were disoriented and hallucinations of hearing were more common that those of sight.

One of the most remarkable things about the series of cases here reported is that in not a single instance was the eye permanently damaged by the conduct of the patient during the delirium. Seven of the eleven cases became rational, and were apparently well before leaving the hospital. One left on the third day still unbalanced, but returned in one month, with a history of having had no mental disturbance after reaching home. Three were still delirious when they left the hospital, one on the twelfth, one on the eighteenth and one on the twenty-first day. No subsequent history was obtained in any one of these cases. Fever was not present in any case.

As a careful history of hereditary psychosis was not included in my notes and but two of the cases were studied by a psychiatrist, the mental disturbances cannot be classified. The following observations, however, may be made:

1. The delirium occurred in 0.29 per cent. of the cases operated.

2. No patient showed marked signs of mental disturbance while under observation, either before or at the time of operation.

3. One case showed possibility of infection from an old cystitis.

4. The urine was free from sugar, albumin or casts in nine cases. No record was made in two cases.

5. Codein was administered in two cases, 1 grain hypodermically, immediately after the operation.

6. The possible effects of cocain can be eliminated, as the mental disturbances did not occur in a single case until at least twenty-four hours after the time of operation, and there was no rise in temperature.

32 Adams Avenue West.