SOMNIFAINE NARCOSIS.

A Symposium held at the Quarterly Meeting of the Royal Medico-Psychological Association, Glasgow, May 14, 1936.

Clinical Aspects.

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Since October, 1934, we have treated 40 cases of psychoses by somnifaine narcosis in the Glasgow Royal Mental Hospital. The technique employed by us was that recommended by Ström-Olsen. The patients were isolated in a quiet room, in partial darkness, and a nurse was constantly in attendance by night and day. As a preliminary to the treatment, insulin and glucose were given for a few days beforehand, while the patient received daily bowel wash-outs. The amount of glucose given was 1 oz. to 1½ oz. three times a day, along with 10 units of insulin. This insulin and glucose routine was continued during the treatment, and for some days after the administration of the somnifaine was discontinued. The somnifaine was injected intra-muscularly in 2-c.c. doses. The degree of narcosis one wished to produce was that approximating as nearly as possible to natural sleep. Throughout, one tried to keep the patient in such a state that they were able to be roused from time to time for feeding. The amount of somnifaine necessary to produce this state varied with each patient, but as a rule we found that 6 c.c. of somnifaine given in 2-c.c. doses in the 24 hours was the average amount required. The treatment was continued for 10 to 14 days.

Complications.

In the series of cases we treated we had the following complications :

One patient, a woman, developed pneumonia, from which she died, on the first day of the treatment, She had only had two injections of somnifaine, and I do not feel that her death can be in any way attributed to the somnifaine.

Symptoms of cerebral irritation occurred in three cases. In one of these the temperature rose to 103° on the last day of the treatment. The patient developed symptoms of cerebral irritation with marked opisthotonos. This symptom lasted for 3 days, and then subsided completely.

In the case of the other patient the symptom of cerebral irritation began the day after the treatment was terminated. The patient had four epileptiform convulsions in the next 24 hours. Her symptoms suggested calcium deficiency, and she was treated with calcium by the mouth. Her symptoms subsided completely. This was the only case of schizophrenia that made a recovery.

The third case was that of a schizophrenic patient, who on the fourth day developed tremors of the face and limbs. These subsided following treatment with calcium gluconate. However, he developed signs of cardiac collapse. His circulation improved, but his temperature rose to 104°, and we considered it wise to stop the treatment on the seventh day.

Elevation of temperature to 102° or over occurred in 6 cases. One patient showed a rise of temperature to 102°, which fell to normal within 24 hours. In the other case the elevation of temperature was due to cystitis, which cleared up with treatment.

One case developed alarming symptoms on the fourth day after the commencement of the treatment. His temperature rose to 104°. Examination of the blood showed marked leucopenia, and although the treatment was immediately

https://doi.org/10.1192/bjp.82.339.423 Published online by Cambridge University Press

stopped, the patient remained in a state of deep narcosis for two days. We felt it unwise to continue treatment in this case.

In another case the treatment was stopped for 48 hours on account of the patient developing a temperature of 102°. We were able to resume treatment, and the patient eventually made a good recovery.

Symptoms of failure of the circulation occurred in 3 cases. One was the case I have already mentioned. Another was that of a man, æt. 50, whose physical condition was poor when the treatment was commenced. Throughout the course the blood-pressure remained low. On the fourth day his colour became very poor, and his pulse rapid and almost imperceptible. He was treated with ephedrine and icoral. His condition improved, treatment was stopped for 24 hours, and then resumed without reappearance of further symptoms.

Another patient showed similar symptoms of collapse of the circulation on the sixth day. In one case the systolic blood-pressure fell to 85 mm. of mercury, but with the administration of ephedrine it rose again, and it was not necessary to suspend the treatment.

Systolic pressure of 90 and 95 occurred in one or two of the cases. We found ephedrine very efficacious in raising the blood-pressure in these cases.

We had no renal complications, except in one case in which the output of urine became dangerously low on the fifth day. The administration of the somnifaine was discontinued for 2 days, and the patient was given alkalis. His renal symptoms disappeared, and we were able to continue treatment. This was one of the cases who made a recovery after treatment.

Catheterization was necessary in 8 of our cases at one time or another during treatment.

Type of Patients Treated.

Of the 40 cases, 20 were women and 20 men. All were suffering from psychoses. We have had no opportunity of treating any psychoneuroses. Twenty-five were cases of manic-depressive psychosis. These were made up of 17 cases of melancholia and 8 cases of mania. There were 10 cases of schizophrenia, 2 cases of involutional melancholia, and 2 cases of paraphrenia.

The cases fell into the following age-groups :

16 were between 20–30 years of age.
10 ,, ,, 30–40 ,, ,,
11 ,, ,, 40–50 ,, ,,
2 were over 50, and 1 case was 61 years old.

The duration of the illness varied from 2 months to several years, but most of the cases were fairly recent, the illness having been present for 6 months to a year before treatment was given.

Results.

With regard to our results, I have put the cases into the following groups :

Recoveries.—That is, those patients who showed a marked improvement almost amounting to recovery immediately following the treatment, and who progressed steadily, so that they were able to be discharged in a few weeks' time.

Permanent improvement.—Cases which showed immediate improvement, or ultimately went on to complete recovery.

Temporary improvement.—Cases which showed an improvement lasting from a week to 4 weeks or over.

No improvement.—A group which appeared to be totally unaffected by the treatment.

In our series we had 5 cases in which we felt justified in attributing the patient's recovery to the treatment. Nine cases were permanently improved, 16 cases showed a temporary improvement, and 10 cases were unchanged by the treatment.

https://doi.org/10.1192/bjp.82.339.423 Published online by Cambridge University Press

Recoveries.—Of 5 cases which recovered, 3 were cases of melancholia, 1 was a case of mania, and 1 was a case of schizophrenia. I wish to comment very shortly on these cases.

CASE 1.—The case of a man, æt. 34, suffering from mania. He had a previous attack 7 years before his present one, from which he made a good recovery after a year's residence in hospital. His present attack began with a period of depression which gave place to a state of excitement. He showed immediate improvement after the somnifaine treatment, and we were able to discharge him recovered 6 weeks after his admission to hospital.

CASE 2 was a young woman, æt. 24, who suffered from an acute excitement characterized by restlessness, auditory hallucinations and attacks of panic. Her illness was of 10 weeks' duration. I have classified this patient as a case of schizophrenia, but I think it is possible that other clinicians might have diagnosed her case as a manic-depressive psychosis. Excitement had been gradually abating before she was subjected to the treatment, but at its commencement she was still in a very disordered state. Immediately following the treatment she showed a very marked improvement, which in the course of a week or two progressed to a complete recovery. As far as I know she has since remained well.

CASE 3 was a man, æt. 37, who on admission suffered from depression, extreme anxiety and apprehension. These symptoms had been present for 6 weeks. He had a previous attack, in which he showed similar, but less severe, symptoms, 4 months before. For this illness he was treated in this hospital, and appeared to make a good recovery without special treatment in 6 weeks.

In this case again the difficulty of diagnosis arose. I have put the case in the manic-depressive group, but certain of the symptoms he showed, such as extreme panics, hallucinations and a somewhat stuporous condition at times, suggested that we might be dealing with a case of schizophrenia. This patient immediately improved after the treatment. He was completely recovered in 2 weeks' time and was discharged from the hospital, and he has since remained well. It is possible, in view of the outcome of his previous attack, that he might eventually have recovered without the treatment, but I feel that in assessing the value of the treatment one cannot ignore the fact that before he was subjected to it he was suffering from gross mental symptoms, which disappeared immediately after he had been given treatment.

CASE 4 was a woman, æt. 50, whose illness had been present for 2 years. She showed extreme depression, resistiveness, refusal of food, extreme restlessness, sleeplessness, and paranoid tendencies. The present occasion was the second on which the patient had been subjected to the somnifaine narcosis. After the first treatment, given a year before the second course, she showed a remarkable improvement, and remained well for 4 weeks, again became depressed and finally relapsed into her former state. On this occasion, following the treatment she showed a very marked improvement. Her depressed, almost stuporous condition gave place to a state of mild elation, in which she was a little over-active, extremely sociable, and showed a slight lack of restraint and judgment. These symptoms subsided very quickly, and she was discharged recovered, and has since remained well.

This is a case in which we regarded the outlook as very unfavourable. The long duration of the illness and the character of the symptoms she showed did not make the case a hopeful one, and the improvement following the treatment was most marked and dramatic.

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CASE 5 is the case of a man, æt. 50, who showed a depression of 8 months' duration. In his case also the symptoms did not suggest a very favourable outcome, but following the treatment his depression disappeared, and we were able to discharge him recovered.

There are two other cases which I was tempted to place among the recoveries, but for certain reasons I have put these cases among the *permanent improvements*.

CASE 6 is that of a young woman, æt. 21, who has suffered from attacks of manic-depressive psychosis since adolescence. When she was subjected to the treatment she was in a state of hypomania. Immediately following the treatment she remained in a mildly excited state for a few days, but gradually her excitement subsided entirely, and she was discharged recovered 2 months later.

In this case I have no doubt that the patient would have recovered from her attack had she not been given the treatment, but I think it is reasonable to suppose that the treatment shortened her attack. She has remained well since her discharge, a year ago, and seems more stable than she had been for many years, and it will be interesting to observe how long she will remain well.

CASE 7.—The other case I have to refer to is that of a man, æt. 40, who had had several previous attacks of acute mania of short duration. Latterly these attacks have been occurring at frequent intervals. His second attack, which was in 1931, only lasted a week, and he was only in hospital 3 weeks. He remained well from then until June, 1934, when he went into a state of acute mania, from which he quickly recovered, so that he was discharged from hospital on July 18, 1934, a month after his admission. He had another attack in August, 1934. He was in hospital a little over a month, and was again discharged. He was hardly out a month when he had another attack, and was admitted in October, 1934. The attack passed off in about a week, but on this occasion he was not discharged, and during the next 12 months he had 5 attacks of acute mania, each of which was treated with somnifaine from the commencement of the symptoms. We found that 7 days' narcosis was sufficient to arrest the attack. On each occasion after the treatment the patient went into a state of mild depression which lasted about a week. He then kept well until the next attack of acute excitement came on. Finally he was discharged on October 9, 1935, and up till now he has remained well.

In this case the somnifaine treatment does not appear to have had any curative influence, and in view of the fact that some of the patient's attacks lasted only a week without treatment, it is doubtful whether the somnifaine treatment had much effect in shortening the duration of his attacks. We did, however, find this treatment extremely useful in controlling the excitement, which was very intense while it lasted.

Permanent improvement.—Nine patients were permanently improved as a result of the treatment. These comprised 5 cases of mania and 4 cases of melancholia. The 5 cases of mania include the 2 cases I have just referred to. Of the other 3 cases of mania, 2 were greatly improved after treatment, and eventually made a good recovery. The third case was that of a young girl, who was in a state of wild excitement before the treatment was given. Her excitement was much less following the treatment, and she is now in a mild state of hypomania, from which she seems to be rapidly recovering.

The 4 cases of melancholia in this group felt relieved after their treatment. They were brighter, they slept better, and eventually all four were discharged from the hospital. One of these cases was particularly interesting. It is that

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of a woman, æt. 61, with a very bad family history, who had been a chronic mental invalid for many years. She developed an acute depression, characterized by delusions of sin and painful obsessional thoughts. These acute symptoms were present for about a year before the treatment was given. Following the treatment there was marked improvement. She became comparatively bright, her obsessional thoughts diminished in intensity, and her conduct became much less inhibited. She left the hospital a few days after the completion of the treatment. Her state of improvement lasted for a few weeks, and then she showed signs of relapse. The physician in whose charge she was gave her a further course of somnifaine, which again resulted in an improvement that has continued up to date. The patient, although by no means recovered, is in better physical health than she has been for many years, and her mental condition is very greatly improved.

Temporary improvement.—Turning now to what is to me perhaps the most interesting group of all, that is, those patients who showed a temporary improvement lasting from a few days to over a month, we had 16 cases which reacted in this way to the treatment. They comprised 8 cases of melancholia, 3 of involutional melancholia, 3 of schizophrenia, and 2 of paraphrenia. The improvement which unfortunately did not last, was in a certain number of the cases of a most dramatic character; for instance, one man, æt. 53, who had suffered from a typical melancholia of 2 years' duration, and who showed symptoms of depression, with mental retardation and suicidal tendencies, was completely transformed immediately after the treatment. He was bright and cheerful, he seemed to have regained his confidence completely, and he slept well. The patient himself described the change as "a new birth". The improvement continued for 3 weeks, but he gradually became depressed, and in a short time had completely relapsed, and, as far as I know, has not recovered.

Another striking case was that of a woman, æt. 47, suffering from involutional melancholia of 15 months' duration. The patient's symptoms were of the most acute kind before she received treatment. She showed extreme agitation, with distressing delusions of sin. Her conduct was grossly disordered, she unclothed herself, and was constantly destroying her clothing and stuffing it into her mouth. She was extremely noisy and difficult to manage. After the treatment she was transformed. She became quiet and composed, her delusions disappeared for the time being; her whole appearance was changed. She was able to go to the hospital sewing-room for a few days and did good work there. This improvement continued for 8 days, and then she relapsed, and in 3 days she was back to her former state of distress and agitation, in which she has continued since.

The improvement in one of the cases of paraphrenia was no less remarkable. The patient, a woman, æt. 46, who suffered from a mental illness characterized by delusions of persecution and hallucinations of hearing, violent outbursts, seemed to make a striking improvement after the treatment. Her hallucinations disappeared, she no longer voiced her persecutory ideas, she was bright and cheerful, and behaved in a normal way. In her case the improvement was maintained for 6 weeks. Then, gradually, mental symptoms reappeared, and now her condition is as bad as it was before the treatment.

An interesting case was that of a medical student, æt. 19, who was admitted suffering from mental symptoms which had been present for 10 days. The course of his initial symptoms suggested a mild manic excitement, but as the illness progressed he developed symptoms which made one fear that he was a case of dementia præcox. Immediately before he was admitted to the hospital he had intense panics; he believed that the room in which he had been was full of Russians ready to pounce on him and kill him. He had curious delusions of a fanciful character. He believed that a remarkable change was going to take

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place in the human race, and that in the future sex would be abolished in human beings, and reproduction would no longer be necessary. He believed that people would live for ever. He tended to mis-identify those around him, and at times he behaved in a very foolish, erratic way.

We felt that this was a case which was particularly suitable for the somnifaine treatment because of the short duration of the illness and the acute character of the symptoms.

After the treatment the patient seemed greatly improved. His behaviour became quite normal, he had some insight into his former delusions, which had now disappeared. The only abnormal thing about him was that he seemed curiously apathetic about his present condition. He did not show the concern that one would expect from an intelligent young man about a serious event of this kind. However, he kept in this state of apparent well-being for several weeks, so that we felt justified in discharging him. Three weeks after he left us he was again admitted to the hospital in a state of confusion, with hallucinations. He continued to have acute symptoms for about a month. During that period he was at times semi-stuporose; lay immobile in bed, and rarely spoke. He improved gradually without any special treatment, so that he was able to be discharged recovered 2 months after his second admission. He has remained well since then.

Unimproved.—In the last group of this series, containing those cases in which the treatment did not produce any improvement, we have 10 cases, comprising 2 cases of mania, 2 cases of melancholia, and 6 cases of schizophrenia. It is, perhaps, not surprising that the cases of schizophrenia did not show any improvement, but it is perhaps surprising that the 2 cases of mania should not have shown even a temporary improvement. They were both typical cases of manic-depressive psychoses. One man eventually recovered, and the other case is still in a state of excitement.

An analysis of the results according to the disease group gives the following results:

Mania: Total cases 8.

Complete recovery	1
Permanent improvement	5
No change	2

Melancholia: 17 cases.

Recovery	3
Permanent improvement	4
Temporary improvement	8
No change	2

It is interesting to compare the results obtained in this group with those reported by Ström-Olsen and McCowan, who treated a similar number of cases in their series. They had the same number of recoveries, namely, 3. Five of their cases were improved, and 9 were unchanged. Their 5 cases of improvement would correspond to our 4 permanently improved patients. To make the comparison valid, 8 cases grouped under temporary improvement would require to be placed in the "No change" group, so that for the purpose of comparison we had 10 cases which showed in this group as against 9 cases in Ström-Olsen's and McCowan's series. The results we obtained in our melancholic cases correspond very closely to those obtained by these two workers.

Involutional melancholia: 3 cases.

No recoveries.
3 showed temporary improvement.

https://doi.org/10.1192/bjp.82.339.423 Published online by Cambridge University Press

Schizophrenia : 10 cases.

Recovery	1
Temporary improvement	3
No change	6

Paraphrenia : 2 cases.

Both showed temporary improvement.

Conclusions.

Prolonged narcosis with somnifaine in a considerable number of cases produces marked improvement in the patient's condition. In a certain number of these cases the duration of the illness is shortened by the treatment.

In a large proportion of the cases the improvement is only temporary, but there are others in which permanent improvement, not reasonably to be expected to occur, has resulted from the treatment.

Treatment is of value in benign types of psychoses. It is of doubtful value in well-established cases of dementia præcox, and even in the benign types of psychoses it is impossible to predict the result of the treatment.

We found that typical cases of mania, in which recovery eventually occurred, did not react so well to the treatment as certain other cases of excitement in which the clinical picture suggested schizophrenia.

The treatment involves some risk to the patient's life.

Psychological Aspects.

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It was with some diffidence that I agreed to contribute towards this discussion because I felt that, having had no personal experience of the use of hypnotic drugs in the modern method of prolonged narcosis, anything I might say might be held by some to be spoken without authority.

As the result, however, of my reading of various reports that have been published, and of conversations with physicians who had actually employed the method, I had already formulated in my mind some notions regarding the possible psychological mechanism involved in those cases where beneficial results have accrued.

I felt that I might take the opportunity of airing my views here in the hope that they might lead to discussion and probably some clarification. Looking to the great variety in the chemical composition of the numerous other drugs besides somnifaine that have been employed by different clincians, I felt that some explanation other than, or should I say rather, in addition to, one based purely upon biological chemistry, was necessary.

I had arrived at the conviction that any beneficial results obtained by this method could and should find a rational explanation in the physiological and psychological laws of "habit" and "resistance". Certainly there are no other laws more profoundly influential in regulating the functioning of the nervous system.

Briefly put, my view was that prolonged sleep interfered with, or, if you like, inhibited for the time being, habitual modes of thought and action, resistance to which, in the wakened state, had been weak and futile. The enforced period of quiescence and rest allowed the patient, under favourable circumstances, to acquire new habits of thought and action, or rather, to select and make better use of ideas already acquired but more appropriate to the vital needs of the moment, more appropriate because more likely to lead to successful issue, being less interfered with, less inhibited by ideas and tendencies which formerly held sway in an almost

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