PUERPERAL MENTAL ILLNESS

A FOLLOW-UP STUDY OF 75 CASES

BY

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Mental illness occurring after childbirth is a common condition. The incidence in all confinements has been variously estimated as 1 in 400 (Boyd, 1942) to 1 in 1,200 (Morton, 1934). It is the cause of 2 to 8% of female admissions to mental hospitals all over the world (Small-don, 1940; Boyd, 1942; Brew and Seidenberg, 1950). What is the prognosis for recovery in the individual case? What is the likelihood of recurrence should the patient become pregnant again? Can recurrence be prevented by social, medical, or psychiatric prophylactic measures? Is termination of pregnancy indicated in any cases, and should sterilization ever be considered? This study is an attempt to answer these and other questions in the light of experience at St. Patrick's Hospital.

Material and Methods

This investigation is a study of 75 patients suffering from puerperal mental illness who were admitted to St. Patrick's Hospital, a private psychiatric hospital, between January, 1947, and June, 1957. During the 10½-year period 80 cases were admitted (2% of 4,006 female admissions) of which five could not be traced. The age of the patients ranged from 21 to 45, with an average of 31.5 years. Patients, or their relatives, were required to fill in a questionnaire giving details about their present state of health, information about all pregnancies, and the occurrence of nervous symptoms, whether associated with childbirth or not. Further correspondence and telephone calls were made in over three-quarters of the cases to elicit details from the patient and to gain objective information from the husband or family doctor. All patients were invited to attend hospital for interview, but, as they came from all over Ireland and the follow-up period was long, a good response could not be expected. The sources of information are shown in Table I.

TABLE I.—Sources of Information

Patient	Questionnaire alone	22	}	41
	plus letter	19		
	Personal interview	18		18
Husband	Questionnaire alone	11	}	29
	plus letter	18		
	Personal interview	3		3
Family doctor				41
Sole information from patient's questionnaire				
	Information from personal interview or family doctor	4		4
	" " husband	55		55
		14		14
Total				73*

* 2 patients had died.

In only four instances (three cases of depression and one of schizophrenia) was there no objective information about the patient's present state of health. The patients interviewed were not selected in any way, but tended to come from the Dublin area (13 of 18).

Time of Onset

In this survey all illnesses which began within six months of childbirth were included as puerperal. Some investigators in the past have taken the obstetrical puerperium of six weeks as their standard, later illnesses being termed lactational. There seems to be no advantage in this. The time of onset of symptoms is shown in Table II. In 14.7% of

TABLE II.—Distribution of 75 Cases According to Time of Onset of Symptoms

During pregnancy	11 (14.7%)
0-14 days after birth	33 (44.0%)
14-28 "	12 (16.0%)
28 days-6 months after birth	19 (25.3%)

cases the earliest symptoms were noticed during pregnancy, but there was a clear-cut exacerbation of symptoms after

confinement, necessitating admission to hospital. It must be noted that in some cases the onset of symptoms was gradual and difficult to date accurately. In many, however, it was dramatically sudden. In 60% of the cases the first symptoms were noticed within one month of delivery.

These figures correspond closely to an average of several series reviewed by Boyd. Mental illness precipitated by abortion has been excluded from this series.

Type of Illness

The cases fell into five diagnostic groups, as follows:

1. *Affective Psychosis*.—This was defined as an illness in which there is a greatly exaggerated emotional response, either depression or elation. Delusions may be present, but they are in keeping with the emotional change—for example, self-accusation or ideas of unworthiness in association with depression. Early wakening and morning exacerbation of depression are often present.

2. *Schizophrenia*.—There is distorted thinking on personal topics, which are often projected as delusions or hallucinations without a corresponding emotional display (Skottowe, 1942). The affect may be one of apathy or fear, or there is incongruity of affect.

3. *Schizoaffective Psychosis*.—There is definite evidence of distorted thinking, delusions, and hallucinations characteristic of schizophrenia. In addition, there is a well-marked affective element, usually depressive with ideas of guilt, but sometimes maniacal. This corresponds to a group called "mixed schizophrenia" by Hemphill (1952).

4. *Toxic Confusional State*.—This was diagnosed only when two conditions were fulfilled: firstly, there was definite evidence of physical illness, such as infection of the genital tract, or breast; secondly, there was confusion, disorientation in time and place, faulty perception, amnesia, and often vivid auditory or visual hallucinations.

5. *Hysteria*.

The distribution of cases is shown in Table III.

TABLE III.—Distribution of 75 Cases According to Diagnosis

Diagnostic Group	Total
Affective psychosis:	
Depression	27
Mania	1
Schizophrenia	15
Schizoaffective psychosis:	
Depression	24
Elation	5
Toxic confusional psychosis	2
Hysteria	1
	73*

The lack of standardization of psychiatric terminology, and the fact that many authors do not define their diagnostic criteria, make comparison with other series very difficult. For instance, the incidence of schizophrenia varies from 20 to 58% in reported series. The incidence of toxic confusional states has fallen over the years, owing partly to improved obstetrics and the advent of antibiotics, and partly to altered diagnosis. Cases previously called "non-toxic delirium," as described by Boyd, would now be classified as schizophrenia. Foundeur *et al.* (1957) found no cases of toxic confusional state in their series of 100 patients, though, unlike other observers, they had a high incidence (21%) of psychoneuroses. The experience in this country is that neurotic reactions, though common, rarely necessitate admission to hospital.

Treatment, Results, and Follow-up

The time interval between discharge and follow-up is shown in Table IV.

TABLE IV.—Time Interval Between Discharge and Follow-up

Diagnostic Group	4 Months-2 Years	2-4 Years	4-6 Years	6-11 Years	Total
Affective	11	8	3	6	28
Schizoaffective	3	9	5	10	27
Schizophrenic	4	3	3	5	15
Toxic confusional	1	0	1	0	2
Hysteria	0	0	0	1	1
Total	19	20	12	22	73*

* 2 patients died.

Affective Group

In this group (27 with depression and 1 with mania) electroplexy was the standard treatment. The immediate response was good in all cases. The average number of treatments given was 7.4, and the average stay in hospital was 5.5 weeks. Of the 28 patients 13 recovered with one course of electroplexy (four to nine treatments)—that is, they had lost all psychotic symptoms and their pre-psychotic personality was restored. Ten cases (including the patient with mania) relapsed within 17 days of ending the first course, but recovered after a second course. Four patients required maintenance treatments, but had all recovered within 4½ months of admission to hospital. One patient who relapsed four weeks after a satisfactory response to a course of treatment refused to return to hospital, and was still depressed five months after the onset of her illness.

Follow-up (average 2½ years after discharge) showed that 24 of the 27 were in normal health, although one had had a further puerperal depressive illness and three had had further non-puerperal illnesses, all of which responded well to electroplexy. Two patients complained of minor neurotic symptoms and one was undergoing treatment for a non-puerperal depression.

The immediate prognosis of affective disorders in the puerperium is therefore excellent and full recovery can be expected with electroplexy.

Schizoaffective Group

Of the 29 patients 28 were treated with electroplexy, and 15 of these had in addition insulin coma therapy (Sargant and Slater, 1954). The average stay in hospital was 12.8 weeks. One patient, who had severe diarrhoea, died suddenly on the fifth day after admission, probably from pulmonary embolism, but necropsy was not carried out. She had been treated with antibiotics and sedatives only. Of the 28, 18 were discharged as recovered and 10 as much improved. The latter had some residual symptoms and had not completely regained their pre-psychotic personality. However, they were considered fit to live at home and look after their family and house.

Follow-up (average 4½ years later) showed that 24 of the 28 patients were in normal health, although two had had further puerperal illnesses and one a non-puerperal psychosis, all of which again responded satisfactorily to treatment. Two patients complained of minor neurotic symptoms and one had died of pulmonary tuberculosis a year after discharge, no details of her mental state being obtainable. The remaining patient had never been completely well since the initial puerperal psychosis and had required admission to hospital for a further puerperal and non-puerperal illness. She was able, however, to live at home and look after her household.

In this group the standard initial treatment was electroplexy. If relapses occurred or if the schizophrenic element persisted when the affect was restored to normal, insulin coma therapy was given.

Schizophrenic Group

Of the 15 patients, 13 were treated with electroplexy, combined in nine cases with insulin coma therapy, in two with intensive reserpine therapy (Moore and Martin, 1957), and in one with chlorpromazine therapy. Of the remaining two patients, one was treated with reserpine therapy but later developed depression, which responded satisfactorily to electroplexy. The other had a spontaneous remission. The average stay in hospital was 12.4 weeks.

Six of the 15 patients were discharged as recovered and nine as much improved. Follow-up (average 4½ years later) showed that all 15 patients were in normal health. One patient had had a further puerperal psychosis, and one had had two further non-puerperal illnesses, all of which again responded to treatment.

These findings suggest that insulin coma therapy combined with electroplexy is a satisfactory treatment of

puerperal schizophrenia. There is insufficient experience from this study to decide whether it can be replaced by tranquillizing drugs.

Toxic Confusional Group

Both the toxic patients were febrile and obviously ill—one with a septic parotitis, the other without clear cause—and both were markedly anaemic. They were treated with antibiotics, parenteral iron, vitamins, and sedatives. One recovered uneventfully and was discharged within six weeks. The other developed depressive symptoms when all signs of toxicity had cleared up: these responded to electroplexy and she was discharged as recovered 11½ weeks after admission. Follow-up showed that both these patients were in normal health.

Hysteria: Untraced Cases

The one case of hysteria had various treatments, including psychotherapy, carbon dioxide inhalations, modified insulin, and electroplexy. She was discharged as improved after 12 weeks. Follow-up showed that she remained as previously, a very neurotic personality, but had never required further treatment in hospital.

Of the untraced cases, two had affective disorders, two schizoaffective psychoses, and one schizophrenia. All five were discharged as recovered or much improved.

In all cases, irrespective of the diagnostic grouping, simple psychotherapy in the form of encouragement, explanation, and reassurance was given in addition to the physical methods of treatment. It was considered important, too, that all patients should join in the active occupational and social therapy routine of the hospital. In some cases iron and vitamin supplements were given. The sedatives used were mostly barbiturates.

Findings at Follow-up

The psychiatric state of the whole series at the time of writing (average follow-up period, four years) is shown in Table V.

Of the 75 patients 65 are now in normal health and two have died. Two patients only have residual psychotic symptoms and it is felt that the patient who is depressed should respond well to another course of electroplexy, if she would agree to come to hospital. Five patients have residual neurotic symptoms, three of these having always had neurotic personalities. One patient is having outpatient treatment for a mild non-puerperal depressive illness. The overall picture, therefore, is very good. It is worth noting that practically all the patients who were only thought to be much improved on discharge are now considered to be recovered. Not one of 75 patients has become a chronic hospital invalid.

TABLE V.—*Psychiatric State of the Whole Series*

Type of Illness	Died	In Normal Health	Residual Psychotic Symptoms	Residual Neurotic Symptoms	Undergoing Non-puerperal Psychosis	Total
Affective	—	24	1	2	1	28
Schizoaffective	2	24	1	2	—	29
Schizophrenic	—	15	—	—	—	15
Toxic confusional	—	2	—	—	—	2
Hysteria	—	—	—	1	—	1
Total	2	65	2	5	1	75

It has been stated that electroplexy should be avoided for one month after confinement because of the danger of embolism from the pelvic veins during the convulsion (Jacobs, 1943; Feldman *et al.*, 1946; Brew and Seidenberg, 1950; Hemphill, 1952). Feldman *et al.* reported a death eight hours after an E.C.T. in a woman, two months after delivery, who had thrombophlebitis of one leg. She probably had had a pulmonary embolus, but a necropsy was not carried out. This is the only case of embolism following E.C.T. given during the puerperium traced in the literature. In the present study 72 patients were given electroplexy, and 12 of these started a course within four

weeks of delivery. In one patient the course was started on the third post-partum day, in six patients on the 12th to 16th days, and in five on the 19th to 24th days. There was no case of pulmonary embolism. In all cases the convulsion was well controlled with the thiopentone and suxamethonium premedication. Impastato and Gabriel (1957) describe a series of 14 patients given controlled E.C.T. uneventfully within one month of confinement.

Incidence of Puerperal Psychoses in Other Pregnancies

The details of these psychoses are shown in Table VI and VII.

TABLE VI.—*Analysis of Other Puerperal Psychoses Related to Previous or Subsequent Pregnancies*

Type of Illness	No. of Patients who had other Pregnancies	No. of other Pregnancies	No. of other Puerperal Psychoses
Affective	22	71	9*
Schizoaffective .. .	28	87	4
Schizophrenic .. .	12	34	2
Toxic confusional ..	1	3	—
Hysteria	—	—	—
Total	63	195	15

* This figure includes 2 previous illnesses in one patient—the only one in the series who had more than 2 puerperal psychoses.

TABLE VII.—*Analysis of Pregnancies Subsequent to that Associated with the First Puerperal Psychosis*

	Patients	Puerperal Illness
1st puerperal illness .. .	75	75
1st subsequent pregnancy ..	44	9 (20.5%)
2nd	23	3 (13.0%)
3rd	9	2 (22.2%)
4th	2	1
5th	1	—
6th	1	—
		15 (18.7%*)

* Calculated as a percentage of 80 total subsequent pregnancies.

It will be seen that 75 women had a total of 270 pregnancies with 90 associated puerperal psychoses—that is, for every pregnancy associated with a puerperal illness there were two normal pregnancies. After the first puerperal psychosis 1 in 5 (20.5%) of the patients had a recurrence with their next pregnancy. The overall relapse rate in all subsequent pregnancies was 18.7%.

Only six of the 11 patients who had had a non-puerperal psychosis prior to their first puerperal illness became pregnant again. They had a total of 12 subsequent pregnancies, three again becoming ill—one on two occasions. These three all fell into the affective group. The non-relapsers comprised two schizophrenics and one schizoaffective. These numbers are too small to conclude that having had a non-puerperal psychosis in addition to a puerperal one necessarily increases the risk in subsequent pregnancies.

It has been stated that it is wise for women who have had a puerperal psychosis to avoid becoming pregnant again for two or three years (Boyd, 1942; Parfitt, 1952). Our experience does not confirm this. 37 patients had another pregnancy after their illness in St. Patrick's Hospital, and 19 of them had their baby within two years, with two associated puerperal illnesses (10.5%). The remaining 18 had babies after the two-year period, with three associated puerperal illnesses (16.6%).

Some Aetiological Factors

Personality.—Information on this subject was not sufficient for the drawing of any definite conclusions. Neurotic features were much more frequently present in the schizoaffective and affective groups than in the schizophrenic. It was noteworthy, too, that 14 of the 15 schizophrenic patients showed no clear pre-psychotic schizoid features such as undue shyness, extreme sensitivity, or emotional coldness. This may have contributed to the excellent response to treatment in this group, for it is generally agreed that in any

psychiatric illness the chances of recovery are higher if the personality is good.

Previous Mental Illness.—In 17 patients (22.6%) there was a past history of mental illness. The corresponding figure given by Hemphill (1952) was 13% and by Foundeur *et al.* (1957) 30%. The latter found that a matched control group of patients with non-puerperal psychoses had exactly the same incidence of previous mental illness.

Family History.—There was a 32% incidence of mental illness in near relatives (grandparents, parents, siblings, uncles, aunts, first cousins). This figure is of the same order as that obtained in patients with non-puerperal psychoses, but it is much higher than that for the general population. This strongly suggests that there is a genetic element in puerperal as in non-puerperal psychoses.

Physical Illness.—13 patients (17.3%) had some form of infection during the puerperium (breast abscess, 3; infection of the genital tract, 1; abscess of buttocks, 1; urinary infection, 1; septic parotitis, 1; phthisis, 1; pyrexia of unknown origin, 5). This cannot be compared directly with the published figures from maternity hospitals, as these are assessed on the basis of a rise in temperature to 100.4° F. (38° C.) or more within 14 days of childbirth. The morbidity figures from the Dublin Maternity Hospitals in the years 1953 to 1955 vary from 0.9% to 5.6%. The considerable disparity between these figures and 17.3% suggests that infection may have played some part in the causation or aggravation of puerperal psychoses. Twelve patients (16.0%) of this series had some degree of anaemia (haemoglobin less than 11.2 g. per 100 ml.). Gatenby and Lillie (1955) found that practically 24% of antenatal patients at the Rotunda Hospital, Dublin, had a haemoglobin of less than 10 g. per 100 ml. This would suggest that anaemia was of no aetiological importance in this series. Blood W.R. was positive in 2 of the 75 patients, without evidence of involvement of the central nervous system. There were two sets of twins in the series and four stillbirths. Eight patients (10.7%) had a prolonged labour or difficult birth. Seven had a caesarean section, at least three being performed on account of nervous symptoms.

Discussion

The findings in this study may be summarized as follows. Puerperal mental illness is not a psychiatric entity, the patterns of illness being the same as those in the non-puerperal state. The prognosis in puerperal illnesses—treated as outlined—is excellent, irrespective of the diagnostic classification. It is not dangerous to give electroplexy controlled by thiopentone and suxamethonium in the first month after confinement, provided there is no evidence of thrombophlebitis. In any subsequent pregnancy there is a one-in-five chance of recurrence. There is no psychiatric basis for advising a patient to avoid having another pregnancy for at least two years after her illness. Subsequent puerperal or non-puerperal illnesses tend to be of the same diagnostic type as the original puerperal illness, and the response to treatment similar. The only definite aetiological factor is the genetic make-up, but infection may be of some importance.

Some of these conclusions are in direct contradiction to statements in other surveys, the major disagreement being on the question of prognosis in those patients showing schizophrenic symptoms. Hemphill wrote that puerperal schizophrenia was a particularly malignant illness, only one of his 19 patients recovering sufficiently to live outside hospital: "Puerperal schizophrenia, in spite of favourable prognostic criteria, is rarely curable." Skottowe stated: "In schizophrenia the prognosis is grave, few patients recovering. The most that can reasonably be expected is stabilization at a level of invalidism necessitating some special care at home; but nearly half of the patients in this group become more or less permanent mental-hospital patients, notwithstanding shock therapy." Boyd stated: "The diagnosis of schizophrenia implies a very serious

prognosis, and the majority of these patients progress to a severe mental deterioration." He felt, however, that the prognosis was slightly better than in schizophrenia occurring apart from childbirth. Brew and Seidenberg wrote: "The prognosis is somewhat poorer in the post-partum schizophrenic reactions than in these reactions in general." This pessimistic outlook is not shared by everyone, however. Mayer-Gross *et al.* (1954) wrote: "The prognosis for the first attack is relatively favourable as in other schizophrenias precipitated by physical illness." Fondeur *et al.*, from their experience with 50 post-partum schizophrenics, state: "It cannot be said that post-partum patients who were diagnosed as schizophrenic do less well than those with other diagnoses." Three out of four of their total group of 100 patients had a reasonable level of recovery four years after their hospitalization.

In view of these conflicting opinions, it is necessary to look critically at this series and at those previously published. The St. Patrick's schizophrenic group possibly comes from a better-off social class than other series. All the patients were married, and marital disharmony and home stresses, such as financial difficulties, were not much in evidence. Physical illness lending itself to correction was relatively frequent. The pre-morbid personality of the schizophrenic group was good. These factors all lend themselves to a good prognosis. In a group with a higher number of illegitimate pregnancies one would expect to find a higher incidence of unstable personalities in whom the prognosis would possibly be less good. Assessment by methods other than personal interview is open to fallacy. As the patients came from all over Ireland, and as the follow-up period was so long, personal interview with the patient was possible in only six of the 15 schizophrenic cases. In seven further cases there was information from the family doctor, and in one of the remaining two cases there was objective evidence from the husband.

Further evidence supporting the view that puerperal schizophrenia has an excellent prognosis is the fact that among the chronic female patients in St. Patrick's, the majority of whom are schizophrenics, there is no case in which the illness started during the puerperium. Moreover, it is the practice in the hospital to consider leucotomy in any illness in which a good remission cannot be obtained with other treatments, and when symptoms are persisting after two years. The records show that this has never been considered or performed in any case of puerperal psychosis. Undoubtedly before the era of active psychiatric treatment puerperal schizophrenia had a bad prognosis. This is amply documented by writers such as McIlroy (1928), James (1935), and Karnosh and Hope (1937). In those days, tuberculosis, pernicious anaemia, and many other diseases also had a bad prognosis, but the outlook has been completely changed by improvements in treatments. Modern psychiatric therapy such as electroplexy, insulin coma therapy, and the tranquillizing drugs, combined with an active social rehabilitation programme, undoubtedly does influence psychoses. Prognosis, therefore, can be assessed only in the light of the treatment given, and many authors, including Hemphill and Skottowe, give no details of intensity and duration of treatment.

There is general agreement that the great majority of patients with depressive illnesses recover, and that electroplexy is a very effective method of treatment. Hemphill, however, wrote: "There is a psychiatric entity—puerperal depression—which differs from the manic-depressive psychosis, and in many ways resembles involutional melancholia." He believes that both puerperal depression and typical manic-depressive cases respond poorly to E.C.T., although eventual recovery is to be expected. There is no evidence from this study to support the view that puerperal depression is a psychiatric entity. Moreover, the response to electroplexy was uniformly good, although some cases pursued a relapsing course.

The only follow-up study of the prognosis in subsequent pregnancies that I have been able to trace is that of White

et al. (1957). Of their 100 patients 22 had a total of 27 additional pregnancies, but only three had a recurrence of their mental illness. They wrote: "From this small sample one might infer that the chances are that one in seven patients will experience mental illness associated with a subsequent pregnancy." Other authors give grave warnings of the dangers of subsequent pregnancies, but quote no supporting figures. Hemphill states: "It seems to be extremely dangerous for a patient who has recovered from puerperal schizophrenia to become pregnant again." Boyd concurs in a very similar phrase. The evidence from this study is that the risk of recurrence in any subsequent pregnancy is one in five. No particular diagnostic group seems more susceptible. Eight of the 15 schizophrenic patients had 13 subsequent pregnancies with only one associated puerperal psychosis. Unfortunately, no criterion by which recurrence may be forecast has been determined. Any recurrence is likely to follow the same pattern as the previous illness, and the response to treatment is likely to be similar. In the light of this knowledge no dogmatic statement can be made about the advisability or otherwise of avoiding further pregnancies. Each case must be decided on its own merits, taking into account the personality of the patient, the degree of desire for another child, and the pattern of the previous illness.

A past history of puerperal psychosis is, in the opinion of some authors, an indication for consideration of therapeutic abortion early in any subsequent pregnancy. Religious and ethical considerations forbid such a practice in Ireland. A recent discussion at the Royal Society of Medicine, London, revealed wide disagreement among psychiatrists about the value of and indications for termination of pregnancy (Pearce, 1957). The findings of this study lend no support to advocates of therapeutic abortion or sterilization. Moreover, termination of pregnancy does not seem to be without psychiatric risk. In 1955, in Sweden, where it is widely practised, Ekblad followed up a series of 479 women in whom abortion had been induced on psychiatric grounds. He found that 25% developed subsequent guilt reactions of varying severity. Siegfried (1951) is quoted as having found 59% of such reactions. Polonio and Figueiredo (1955), in a study of 244 puerperal psychoses in Lisbon, found spontaneous abortion responsible for 20% of the cases.

It would seem wise, in the individual case presenting early in a subsequent pregnancy, to inquire about marital stresses and home difficulties which might be alterable. Efficient antenatal care should be ensured, to minimize infection and anaemia. Encouragement and reassurance will often be necessary. Four patients in this series developed anxiety symptoms during ensuing pregnancies. These responded well to simple psychotherapy and mild sedation.

The conflicting views about psychoses associated with childbirth can be resolved finally only when large-scale studies with careful and personal follow-ups are undertaken. It would seem to be an eminently suitable and worth while subject for a Medical Research Council investigation co-ordinating the facts from a number of centres.

Summary

75 patients who had suffered from puerperal mental illness were followed up for periods varying from 4 months to 10½ years. Diagnosis, treatment, and results are analysed.

65 of the patients are now in normal health and only 2 have residual psychotic symptoms. None have become chronic hospital invalids. All 15 schizophrenic patients are fully recovered. The diverse views on the prognosis in puerperal schizophrenia are reviewed and discussed.

Electroplexy controlled by relaxants was given uneventfully to 12 patients within one month of confinement. It is considered to be safe, provided there is no evidence of thrombophlebitis.

The recurrence rate of puerperal mental illness in subsequent pregnancies in this series was 1 in 5 (18.7%). Relapse was not more frequent when the next birth occurred within two years of the illness.

Therapeutic abortion is discussed.

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ACUTE LARYNGOTRACHEOBRONCHITIS TREATED WITH 0.125% SUPERINONE

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0.125% superinone is a surface-active agent which acts by lowering surface tension, causing liquefaction of thick mucoid and purulent exudations in the upper respiratory tract and bronchial tree. Thickening of the sputum and dryness of the respiratory membranes are minimized, permitting better ciliary action and thus facilitating expectoration. Superinone is made up in a sterile alkaline medium ("alevaire"), which is administered as an inhalation in the form of a fine mist produced by a nebulizer usually activated by oxygen. It may be given intermittently or continuously (see illustration).

Acute laryngotracheobronchitis is usually of sudden onset and often follows a mild upper respiratory infection. It may be rapidly fatal, death being due either to asphyxia caused by laryngeal obstruction with thick viscid mucus or to toxæmia. The infection is probably of virus origin (Rabe, 1948). Cytopathogenic agents have been isolated from the secretion of several patients (Beale *et al.*, 1957), and in a recent paper Beale *et al.* (1958) demonstrated that the presence of these bodies in cases of acute laryngotracheobronchitis is associated with a rise in antibodies during convalescence. Clinically the appearances are reminiscent of laryngeal diphtheria (Garson, 1950), and before the name laryngotracheobronchitis was coined many cases were thought

to be due to this cause, though this diagnosis was never confirmed at post-mortem examinations.

The advent of chloramphenicol was of great value in dealing with the infection and toxæmia (Moncrieff and Weller, 1949), thus reducing the mortality; but the treatment of the asphyxia proved more difficult. Mild cases may be treated by steam inhalation if there is no evidence of bronchopneumonia, but as the patients are anoxic oxygen must be given as well. These patients

Apparatus for administering alelaire in a fine mist.

were therefore nursed in an oxygen tent, being transferred to a steam tent for 10 minutes every hour. Pharyngeal suction was carried out every 15–20 minutes. For cases with asphyxia bronchoscopic suction seemed rational, but this was not always possible and the manipulations involved could easily prove fatal. Tracheotomy then was the only means of trying to prevent death from asphyxia, but, although this successfully bypassed the obstructed larynx, one still had to deal with the viscid exudate in the trachea and bronchial tree. It was felt, therefore, that 0.125% superinone might be of use in dealing with this exudate, and the following is a report of five cases so treated.

Case Reports

Case 1.—A female infant aged 6 weeks was admitted to hospital on February 6, 1958, with a 24-hour history of a cough and cold. She had become very pale and short of breath in a few hours. The birth, personal, and family history revealed nothing relevant. On examination she was afebrile, but grey, cyanosed, and distressed, with rapid breathing and some subcostal recession. Air entry was good, with crepitations at the right base. Post-nasal mucus in small quantity was present. Penicillin was prescribed and the infant nursed in an oxygen tent. She became very much worse some 12 hours later, with marked respiratory embarrassment, collapse, and cyanosis. Air entry over the