patients who were treated with cortisone or aspirin: 102 of these patients were treated additionally with 600,000 units of penicillin in oil containing aluminium stearate upon admission to the study and at three-day intervals for four injections. The 71 remaining patients received the first injection of penicillin after a delay of five or six days. The incidence of valvular heart disease eight months after onset was 30% in the group who received penicillin immediately and 54% in those in whom there was a delay in starting.

Mortimer *et al.* found the degree of reduction of valvular disease significant in patients with moderate or no signs of valvulitis at the time penicillin therapy was instituted. Of those patients without advanced valvular disease, 52% of the control group exhibited valvular disease one year later compared with only 21% of the penicillin group, which on the chi-square test is significant at the 1% to 5% level.

From the results of the study by Mortimer *et al.* the favourable action of penicillin was presumed to have been due to the elimination of streptococci either from the oropharynx or from the valves. Group A streptococci were isolated from the oropharynx in only 15% of their cases, but 79% had a positive A.S.O.

A possible explanation for the difference in the results might be in the estimation of the cardiac state initially and also in the severity of cardiac involvement. Rheumatic fever now generally takes a much milder form in this country, whereas in Chile it still appears in severer forms. Only five of our patients had grade 3 murmurs, all of whom improved, and many of the rest had trivial murmurs. Seven out of 15 test patients and 7 out of 17 control patients with endocarditis lost all their murmurs before they were discharged from hospital, and three additional patients in each group lost some but not all their murmurs before discharge.

The murmurs heard in our patients seem to differ in behaviour from those reported by Mortimer *et al.* They claimed that if a murmur was heard on three occasions in the first 48 hours after admission it was to be regarded as "fixed" or non-reversible, and, with the exception of three control patients, all those 27 cases with "fixed" murmurs had organic murmurs at one year. This is not our experience. Seventeen of our patients had murmurs on admission (nine test, eight control), many of which lasted for approximately six weeks, but 11 of them had no organic murmurs at follow-up.

The significant findings in Mortimer's group related to those patients who had what those authors called "non-fixed" reversible murmurs—that is, where there was no organic murmur, or inconstantly heard murmurs, during the first 48 hours. However, in our series, 13 patients were heard to develop murmurs after admission to hospital—six in the test group and seven in the control group. The six in the test group were already on or had completed the course of bactericidal doses of penicillin when the murmurs were first heard. (This does not confirm the advantage of early penicillin suggested by Mortimer *et al.*) Two of each group had organic murmurs left at one year, and one other control patient had lost one of his murmurs while still retaining the other.

Conclusions and Summary

The results of our series of cases of rheumatic fever treated with penicillin do not show any significant difference in cardiac state at one year between the

penicillin-treated and control groups. The numbers are small, 51 patients in all, but the improvement rate in both groups is high—93% in the treated group and 76% in the controls. The same proportion of both groups had carditis initially, 84% of the murmurs being fairly trivial, grade 1–2, and only 16% having grade 3 murmurs. All those with grade 3 murmurs improved, two having no organic murmurs and three diminished murmurs.

Half of the test group with endocarditis had involvement of only one valve, whereas two-thirds of the control group had only one valve affected.

A raised A.S.O. titre on admission was found in 82% of the patients, though only 10% had positive oropharyngeal cultures. The mean duration from onset of illness to the first A.S.O. estimation was similar in the two groups, but the A.S.O. titre was unexpectedly slower to return to normal in the group who received penicillin. However, the two means are not significantly different ($t=1.45$; $P=0.2-0.1$).

We have therefore been unable to repeat the results obtained by Mortimer *et al.*, and have discontinued treatment with bactericidal penicillin, except where positive throat or nose cultures are obtained.

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PREGNANCY AND ADRENOCORTICAL HORMONES

SOME ASPECTS OF THEIR INTERACTION IN RHEUMATIC DISEASES*

BY

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Although various disturbances of reproduction have been induced in experimental animals by the use of very large doses of adrenocortical hormones, there is little information on whether the administration of therapeutic doses carries any hazard in human reproduction; it is also not known whether the tendency to improvement usually seen in the serious rheumatic diseases during pregnancy may be modified by such therapy.

In this paper the results of pregnancies in women who were receiving adrenocortical hormones are described, and attention is drawn to the need for further investigation of this problem.

Material.—Ten patients with rheumatic diseases who between them have had 20 pregnancies, of which the details are set out in Table I, have been studied; treatment with corticosteroids or with corticotropin was given during 13 pregnancies. Five of the patients were under the care of Dr. W. S. C. Copeman at the West London Hospital, and the remainder were under the care of Professor J. H. Kellgren at the Manchester Royal Infirmary.

*Based on material submitted in a thesis for the degree of M.D. of the University of London.

Results

Course of Pregnancy

Five patients with rheumatoid arthritis had 13 pregnancies, five of which preceded the onset of disease and were normal; two pregnancies which followed the onset of disease and during which corticosteroids were not given were also normal. Treatment with corticotropin or a corticosteroid was given during six pregnancies, of which three were normal.

Three pregnancies in the patients with rheumatoid arthritis were abnormal in some respect: one was complicated by transient hypertension, delivery being by elective caesarean section at 36 weeks; the second terminated in birth of a postmature stillborn foetus, death possibly being due to a virus infection in the mother; the third ended in miscarriage at three months, prednisolone having been withdrawn at six weeks.

Four patients with systemic lupus erythematosus had six pregnancies, during which treatment with a corticosteroid was given; all of these occurred after the onset of disease, only one being normal.

Five pregnancies were abnormal. One was complicated by appendicitis at three weeks but was otherwise uneventful. Two were complicated by ante-partum haemorrhage in the eighth month: one of these had a normal delivery at term, but the other resulted in

precipitate delivery, followed by post-partum collapse, at 34 weeks. One was apparently normal but the foetus was stillborn; the cord was tightly wound round the neck and death was due to asphyxia. In the fifth pregnancy caesarean section for persistent breech was followed by post-operative collapse.

One patient with ankylosing spondylitis had one pregnancy after the onset of disease and was treated with cortisone until the twenty-fifth week. She had pyelitis early in pregnancy and later pre-eclamptic toxæmia; labour was induced surgically, but delivery was by caesarean section for inertia. The foetus, which was premature, died from aspiration pneumonia six hours after birth.

Two patients with systemic lupus erythematosus who had been receiving corticosteroids became unexpectedly shocked shortly after delivery.

One patient (Case 7) was precipitately delivered of her second baby at 34 weeks gestation after being 12 hours in labour. Five minutes after completion of the third stage she became shocked, and although the loss of blood was only about 5 oz. (140 ml.) the blood-pressure fell to 50/0. Hydrocortisone (100 mg. of the hemisuccinate) was immediately given intravenously, and within five minutes the blood-pressure had risen to 100/60. This patient had received no steroids during labour other than 5 mg. of prednisolone given 12 hours before delivery.

TABLE I

Case No.	Diagnosis	First Pregnancy	Second Pregnancy	Third Pregnancy
1	R.A.	Aged 16. R.A. started in third month: no steroids. Normal pregnancy; birth wt. 5 lb. 9 oz. (2,525 g.)	Aged 18. On corticotropin 40 u./day at conception, after 5 months' treatment: corticotropin given throughout. Normal pregnancy; birth wt. 7 lb. 5 oz. (3,315 g.)	—
2	R.A.	Aged 22. Preceded disease. Normal pregnancy; birth wt. 5 lb. (2,270 g.)	Aged 25. Preceded disease. Normal pregnancy; birth wt. 6 lb. 12 oz. (3,060 g.)	Aged 39. R.A. for 6 years; on corticotropin 12.5 u./day at conception, after 4 years' treatment; corticotropin given throughout apart from 3-weeks interruption. Transient hypertension; elective caesarean at 36 weeks; birth wt. 3 lb. (1,360 g.)
3	R.A.	Aged 20. Preceded disease. Normal pregnancy; birth wt. 7 lb. 1 oz. (3,205 g.)	Aged 23. Preceded disease. Normal pregnancy; birth wt. 7 lb. 7 oz. (3,375 g.)	Aged 37. R.A. for 4 years: on prednisolone 12.5 mg./day at conception after 15 months' treatment; prednisolone given throughout. Normal pregnancy; birth wt. 6 lb. 1 oz. (2,750 g.)
4	R.A.	Aged 20. R.A. for 2 years: no steroids. Normal pregnancy; birth wt. 7 lb. (3,175 g.)	Aged 22. On prednisolone 10 mg./day at conception, after 10 months' treatment: prednisolone given throughout. Stillborn: ? viral infection; 2 weeks post-mature; birth wt. 4 lb. 9 oz. (2,070 g.)	
5	R.A.	Aged 27. Preceded disease. Prolonged labour, forceps; birth wt. 8 lb. 13 oz. (3,995 g.)	Aged 32. R.A. for 3 years: on prednisolone 10 mg./day at conception, after 35 months' treatment; prednisolone withdrawn at sixth week. Miscarriage at 3 months	Aged 32. On prednisolone 10 mg./day at conception, after 39 months' treatment: prednisolone given throughout. Normal pregnancy (surgical induction); birth wt. 7 lb. 6 oz. (3,345 g.)
6	S.L.E.	Aged 26. Low-grade S.L.E. for 5 years; on prednisolone 22.5 mg./day at conception, after 2 years' treatment; prednisolone given throughout. Normal pregnancy; birth wt. 8 lb. 7 oz. (3,825 g.)	Aged 28. On prednisolone 5 mg./day at conception: prednisolone given throughout. Appendicitis at 3 weeks, otherwise normal pregnancy; birth wt. 8 lb. 6 oz. (3,800 g.)	
7	S.L.E.	Aged 27. S.L.E. for 8 years: on prednisolone 12.5 mg./day at conception, after 13 months' treatment; prednisolone given throughout. Stillborn—cord round neck; birth wt. 5 lb. 10 oz. (2,550 g.)	Aged 28. On prednisolone 12.5 mg./day at conception, after 29 months' treatment: prednisolone given throughout. Ante-partum haemorrhage; precipitate delivery at 34 weeks; post-partum collapse; birth wt. 3 lb. 6 oz. (1,530 g.)	
8	S.L.E.	Aged 21. S.L.E. for 2 months: on prednisolone 27.5 mg./day at conception, after 2 months' treatment: prednisolone given throughout. Ante-partum haemorrhage at 34 weeks; birth wt. 6 lb. 6 oz. (2,890 g.)		
9	S.L.E.	Aged 36. S.L.E. for 3 years: on prednisolone 2.5 mg./day at conception, after 2 years' treatment: prednisolone withdrawn after 12th week: caesarean (persistent breech); post-operative collapse; birth wt. 7 lb. 3 oz. (3,260 g.)		
10	A.S.	Aged 29. A.S. for 2 years: on cortisone 75 mg./day at conception, after 20 months' treatment: cortisone withdrawn after 24th week. Pyelitis; pre-eclampsia; surgical induction—inertia—caesarean; foetus died after 6 hours—aspiration pneumonia; 4 weeks premature; birth wt. 6 lb. 3 oz. (2,805 g.)		

R.A. = Rheumatoid arthritis. S.L.E. = Systemic lupus erythematosus. A.S. = Ankylosing spondylitis.

The other patient (Case 9) underwent elective caesarean section for persistent breech presentation. Thirty minutes after operation the blood-pressure suddenly fell to 85/40 but rose to 100/70 within 15 minutes after the intravenous injection of hydrocortisone (100 mg. of the hemisuccinate); it fell slightly to 90/60 during the next hour, and rose again to 110/75 when a further injection of 40 mg. of hydrocortisone was given and a hydrocortisone intravenous drip was set up. This patient received 200 mg. of cortisone acetate intramuscularly 12 hours and 100 mg. four hours before operation, and 100 mg. of hydrocortisone hemisuccinate intravenously two hours before operation, but became shocked in spite of what was thought to be adequate preparation; loss of blood at operation had not been excessive and there was no other obvious cause for shock.

Fertility

None of the patients in this series showed any obvious impairment of fertility as a result either of their disease or of treatment; the highest dose of corticosteroids being given at the time of conception was 27.5 mg. of prednisolone daily in Case 8.

Course of Disease, and Treatment

The clinical course of disease during and after pregnancy in relation to treatment is summarized in Table II. Although symptomatic improvement was evident in four pregnancies during which treatment was given, complete remission of symptoms developed in only two of these. It was possible to reduce maintenance doses of corticosteroids or corticotropin in nine pregnancies, but attempts to reduce too rapidly were followed by increased evidence of disease activity, except in the two pregnancies in which full remission developed. During six pregnancies there was slight overall deterioration or evidence of increased disease activity; one of these was in a patient not receiving treatment.

Some degree of post-partum relapse was the rule, whether corticosteroids were given or not, and it was usually necessary to give increased doses; the most severe post-partum relapses were seen in patients who showed deterioration during pregnancy.

Corticosteroid Excretion

Estimations of the urinary 17-hydroxycorticosteroid (17-(OH)CS) excretion (Appleby *et al.*, 1955) were made

in two patients who received corticotropin throughout pregnancy.

In Case 1 the 17-(OH)CS excretion was moderately increased during the month before pregnancy and the first eight weeks of gestation, and acne and hirsuties became increasingly severe at this time. These side-effects then slowly regressed, while 17-(OH)CS excretion fell to normal levels but symptoms continued to be well suppressed. The dose of corticotropin, which had been steadily reduced during pregnancy, was not increased after delivery, but 17-(OH)CS excretion was substantially higher during the first post-partum month than in the preceding months: later estimations were within the normal range. Symptoms remained mild during the post-partum period even when 17-(OH)CS excretion was not raised, but the E.S.R. was persistently high.

In Case 2 the 17-(OH)CS excretion was substantially elevated during the three months before pregnancy and the first trimester (see Chart): there was slight mooning of the face and, latterly, mild hypertension, while symptoms were largely suppressed. Withdrawal of corticotropin at the end of the first trimester was closely followed by clinical relapse, hypotension, and a decline in 17-(OH)CS excretion. When treatment was resumed in a smaller dose the blood-pressure returned to normal; during the second and third trimesters 17-(OH)CS excretion was normal or slightly increased and there was slight moon-face, but suppression of symptoms was only moderate. After delivery the 17-(OH)CS excretion rose gradually to 116 mg./24 hours at six weeks; the dose of corticotropin was increased from 5 to 10 units on the day after delivery, and material from the same batch was used throughout this period. At this time she became frankly hypertensive and more moon-faced, and these effects did not subside for several months, although the 17-(OH)CS excretion declined within a few weeks to levels which were usually within the normal range. Symptoms were almost completely suppressed during the first two post-partum months and remained mild during the later months.

Additional Data

Professor E. G. L. Bywaters and Dr. B. M. Ansell have kindly supplied data on an additional eight pregnancies in five patients who were receiving cortico-

TABLE II.—*Course of Disease in Relation to Corticosteroid Treatment*

Case No.	Six-month Period Before Pregnancy	During Pregnancy	Six-month Period After Delivery
1	Partial suppression of symptoms	Improved; dose reduced by 2/3	Improvement maintained; dose not increased
2	Major suppression of symptoms	Relapsed when treatment interrupted: symptoms afterwards partially suppressed on 1/3 of previous dose	Partial suppression maintained with increased dose
3	" " " "	Partial relapse, then much improved: dose reduced by 2/3 in last trimester	Gradual relapse despite increased dose
4	Partial suppression of symptoms	Dose reduced by 1/2; improved during last trimester	Rapid relapse; slowly improved with rest and unchanged dose
5 (1st)	" " " "	Rapid improvement; treatment stopped at 6 weeks; miscarried at 3 months	Rapid relapse; treatment resumed
5 (2nd)	" " " "	Gradual partial relapse; dose unchanged	Deterioration on reduced dose; with rest and increased dose improved
6 (1st)	Major suppression of symptoms	Suppression maintained; dose reduced by 3/5	Suppression maintained; dose slowly reduced
6 (2nd)	Suppression maintained	Suppression maintained; dose unchanged	Suppression maintained; dose unchanged
7 (1st)	Major suppression of symptoms	" " " "	Temporary relapse after injury; dose unchanged
7 (2nd)	Suppression maintained	Slight increase in symptoms after reduction of dose by 1/5 at 4 months and after later reduction by further 1/5: mild relapse at 33 weeks after ante-partum haemorrhage	Complete suppression on increased dose
8	Major suppression of symptoms	No real remission; attempts to reduce dose followed by partial relapse	Mild relapse; improved with temporarily increased dose
9	Remission maintained on small dose	Remission continued; treatment stopped at 3 months	Remission continued at 1 month; treatment in larger dose resumed immediately after delivery
10	Partial suppression of symptoms	Improved; treatment withdrawn at 6 months	Remission continued without treatment

steroids while under their care at the Hammersmith Hospital: three of these patients had rheumatoid arthritis, one psoriatic arthropathy, and one systemic lupus erythematosus.

Seven pregnancies began while doses ranging from 6 to 22.5 mg. of prednisolone were being given (62.5 mg. of cortisone being regarded as equivalent to 12.5 mg. of prednisolone). There were no major complications during pregnancy, but two patients had miscarriages.

One patient, having had one previous normal pregnancy, miscarried twice while taking 20–25 mg. of prednisolone daily; she may also have miscarried on two later occasions within a few weeks of conception while taking 16–20 mg. of triamcinolone daily; this patient had severe rheumatoid arthritis which remained persistently active in spite of continuous treatment with corticosteroids in high doses. The other patient miscarried while receiving 20 mg. of prednisolone daily for active systemic lupus erythematosus; her second pregnancy, when the disease was less active and the dose of prednisolone had been reduced to 9 mg. daily, was successful.

One baby had a cleft-palate, the mother having received 62.5 mg. of cortisone daily during the first six months of pregnancy.

The mean birth weight of full-term infants was 6 lb. 12 oz. (3,060 g.).

Discussion

Fertility

Thirteen patients conceived on 19 occasions during treatment with prednisolone in doses ranging from 2.5 to 27.5 mg. daily, or, in one case, with cortisone 75 mg. daily; the results suggest that cortisone and prednisolone, even when given in fairly large doses, do not impair the ability to conceive.

Treatment with corticotropin, however, may possibly result in a temporary decrease in fertility since it causes an increase in adrenal androgen production, often manifested in young women by androgenic side-effects (acne, hirsuties, loss of scalp hair, amenorrhoea). The observed fertility of women receiving oral corticosteroids accords with the relative infrequency with which severe androgenic side-effects are induced by this treatment (Thorn *et al.*, 1954; Savage *et al.*, 1959).

Complications of Pregnancy

It has been suggested that a disturbance in the metabolism or secretion of the adrenocortical hormones might play a part in the aetiology of toxæmia of pregnancy, but Margulis *et al.* (1954) found that treatment with cortisone or corticotropin did not induce toxæmia or hypertension. Barnes (1954) commented that the evidence did not suggest a causal relationship or that these drugs were effective in treatment. The cases reported here support this view, since only one treated patient developed toxæmia, and in this case cortisone had been withdrawn six weeks previously. In Case 2 corticotropin treatment was probably responsible for a transient rise of blood-pressure, but this was clinically unimportant and was not followed by toxæmia.

There are no published data bearing directly on the influence which corticosteroid treatment might have on the course of labour and the puerperium, but in this series no adverse effects clearly attributable to the treatment were observed. The healing of surgical wounds is not ordinarily impeded by corticosteroid administration (Popert and Davis, 1958) and there is no reason to suppose that the wounds of obstetrical operations would behave differently.

Adrenal insufficiency may ensue when treatment with corticotropin or corticosteroids is suddenly withdrawn

Case 2. Details at time of third pregnancy.

at a time of increased stress, and though the need to give increased doses before surgery is well recognized the importance of treating the parturient woman who is receiving steroids in the same way has not been sufficiently emphasized. Two patients in this series developed post-partum shock which was almost certainly due to adrenal insufficiency (Cases 7 and 9). Since the course of labour cannot be predicted, it would appear essential to give at least 200 mg. of cortisone acetate intramuscularly at the onset of labour, preferably as separate injections of 100 mg. in two different sites: further intramuscular injections of 100 mg. of cortisone acetate should be given eight-hourly until 24 hours after delivery and 100 mg. of hydrocortisone hemisuccinate should be given intravenously immediately after delivery and at the first sign of collapse.

Foetal Deaths

The incidence of abortion in the general population is not known with certainty, but most authors agree that at least 10% of pregnancies terminate in spontaneous abortion (Nesbitt, 1957). Of 42 reported pregnancies in which corticosteroids were given during the first trimester, 2 (5%) terminated in spontaneous abortion; 1 was interrupted surgically. Out of 21 pregnancies in the present series during which corticosteroids were given during the first trimester, spontaneous abortion occurred in 4 (19%); one patient had discontinued her treatment at 6 weeks and aborted at 12 weeks, and two of Professor Bywaters's patients, both of whom had severe active disease, had abortions.

In 63 reported cases in which corticosteroid treatment was given at some stage of pregnancy for various medical disorders there were four stillbirths and two neonatal deaths. In this series there were three perinatal deaths in 21 treated pregnancies; the same patients had had nine other successful pregnancies, five of which preceded the onset of disease. Two babies were still-born, one dying during labour from anoxia due to the cord being tightly wound round the neck; the other died about four days before delivery while the mother was suffering a severe attack of influenza. A third baby died six hours after delivery from aspiration pneumonia, but corticosteroids were not being given to the mother at this time. There were no perinatal deaths in Professor Bywaters's patients.

There is some evidence that the incidence of spontaneous abortion and foetal death is increased in systemic lupus erythematosus, but most of the published statistics relate to patients who were not treated with corticosteroids. Ellis and Bereston (1952) reported an incidence of spontaneous abortion in subacute systemic lupus erythematosus of 46%, while an increased foetal mortality has been reported by Friedman and Rutherford (1956), Murray (1958), and Larson (1961). In the present series the incidence of foetal death in systemic lupus erythematosus was not significantly different from that in rheumatoid arthritis, and it is possible that this was due to suppression of disease activity by corticosteroid treatment. There is no evidence that any foetal deaths in this series were attributable to corticosteroid treatment.

Congenital Malformations

There is experimental evidence that administration of cortisone may induce developmental abnormalities in certain rodents (Fraser and Fainstat, 1951; Fainstat, 1954), susceptibility to this effect being determined by

the maternal and foetal genotype as well as by dosage and timing of administration; the actions of other teratogenic agents, such as hypervitaminosis-A and x-radiation, are also enhanced (Millen and Woollam, 1960). The doses of cortisone necessary, ranging from 25 mg. daily in rats to 2.5 mg. daily in mice, are very large compared with those used clinically, and smaller doses are ineffective.

There were four examples of congenital deformity in 63 reported pregnancies at some stage of which treatment with corticosteroids was given (Wells, 1953; Harris and Ross, 1956). Only in the case of Harris and Ross does it seem at all likely that the abnormality was related to treatment, since cortisone was given in very large doses at the time of embryological development of the organs concerned. In the present series one of Professor Bywaters's patients, who had received 62.5 mg. of cortisone daily during the first six months of pregnancy, had a baby with cleft-palate. In the total of 81 cases reported previously and in this paper, the incidence of malformation is 6.2% compared with the incidence in the general population of 0.47-2.42% (King, 1953), but since the influence of other factors cannot be weighed the higher incidence in this small selected group may be fallacious.

Administration of androgens or of hormones giving rise to androgenic metabolites may, if the foetus is genetically female, result in partial conversion of the basic neutral female configuration to the male type; Wilkins (1960) has also reported 10 cases of partial female pseudohermaphroditism associated with the development during pregnancy of mild virilism in mothers who had not received hormonal treatment. Two patients in this series who received corticotropin showed virilization, and it seems possible that partial masculinization might result from this type of treatment. No significant virilization was seen in patients treated with oral corticosteroids, and it is probably wiser to substitute these for corticotropin if clinical evidence of increased androgen secretion is seen.

Adrenal Insufficiency in the Foetus

The functional status of the adrenal cortex in newborn infants has not been fully determined, and whether it is necessary to give supplementary corticosteroids to babies born to mothers who have received them is uncertain. Since the plasma 17-(OH)CS level of the foetus reflects that of the mother (Bayliss *et al.*, 1955), it is reasonable to suppose that an abnormally high maternal concentration would result in a corresponding depression of foetal corticotropin secretion. If the mother is clinically hypercorticotoid at the time of delivery it might be wise to administer supplementary corticosteroids to the infant; Barnes (1954) suggests giving 5 mg. of cortisone acetate by injection immediately after delivery, with diminishing doses on the next four days. None of the mothers in this series had more than slight evidence of hypercorticism at delivery; none of the infants was given supplementary treatment, and there is no evidence to suggest that such treatment would have been beneficial.

Summary

Twenty-eight pregnancies in 15 patients with rheumatoid arthritis, systemic lupus erythematosus, ankylosing spondylitis, or psoriatic arthropathy are reviewed: five of these patients were under the care of Professor Bywaters at the Hammersmith Hospital.

Treatment with corticotropin or corticosteroids, given during 21 pregnancies, had resulted in no obvious reduction of fertility; the highest dose being given at the time of conception was 27.5 mg. of prednisolone daily. Four pregnancies terminated in abortion and three in foetal death, while one baby had a cleft-palate, but there was no evidence that these mishaps were related to treatment. The birth weights of full-term babies were within normal limits.

Toxaemia of pregnancy developed in one patient, but this was probably unrelated to cortisone treatment. In another patient hypertension correlated closely with urinary corticosteroid excretion and was probably the result of corticotropin treatment.

Corticosteroid treatment was not obviously associated with an increase in obstetrical complications.

Symptoms generally improved during pregnancy, but complete remission was seen relatively infrequently, although it was usually possible to reduce corticosteroid dosage substantially during the later months. Severe disease, previously in an active phase, generally showed measurable improvement during pregnancy but progressive deterioration afterwards, whether corticosteroids were given or not, and this was especially noticeable if symptoms increased during pregnancy. Patients with quiescent, long-standing, or low-grade disease showed little change.

Two patients collapsed after delivery. The importance of giving generous additional doses of corticosteroids throughout labour to previously treated patients is emphasized.

I wish to record my debt to the late Dr. Peter Davis for the stimulation and help he gave me throughout my study of these patients. I am grateful to Dr. W. S. C. Copeman and to Professor J. H. Kellgren for advice and for permission to report, and to the obstetricians, in particular Professor W. I. C. Morris, who supervised the perinatal care of the patients and kindly supplied me with clinical details. I thank Dr. J. Sharp and Dr. Donald Longson for constructive criticism, and Dr. Leslie Chapman for the urinary steroid estimations on Dr. Copeman's patients. I wish to express my gratitude to Professor E. G. L. Bywaters and Dr. B. M. Ansell for allowing me to include details of their patients, and for their helpful advice.

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THE GENERAL PRACTITIONER AND THE SCHIZOPHRENIC PATIENT

BY

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The present trend towards community care of the mentally ill has led to a considerable increase in the number of schizophrenic patients discharged from mental hospitals. Brown, Parkes, and Wing (1961), in a study of admissions to three London mental hospitals during 1951 and 1956, showed that, in spite of an increased chance of readmission and particularly multiple readmissions, schizophrenic patients are now spending more time in the community.

This paper describes one aspect of the care of schizophrenic patients discharged from mental hospitals in London: the services provided by the general practitioner and the psychiatric out-patient clinics. It is not intended to investigate the efficacy of treatments or to discuss the advisability of treating these patients outside hospital.

Method

The study was carried out as part of a larger investigation into the problems of schizophrenic patients who return to their relatives or to lodgings after a period of time in a mental hospital. The 100 patients included in this study were men of whose impending discharge to addresses in the London area we were notified by the superintendents of eight London mental hospitals. The patients excluded were those whose stay in hospital was less than one month, those discharged to hostels, those over the age of 50, non-Europeans, and those in whom the diagnosis of schizophrenia was not confirmed by a psychiatrist from this unit who saw the patient before discharge. It is difficult to say how typical of discharged schizophrenic patients this population is; but in two important respects the patients were found to match closely the schizophrenics in the study made by Brown *et al.* (1961) of admissions to three hospitals. The age distribution for male patients under 50 is very similar, and the proportion of discharged patients readmitted within one year is almost identical—43% in this study and 45% in the study of Brown *et al.* (1961).

A sociologist (G. W. B. or E. M. M.) visited the patient's relatives immediately before his discharge and again a fortnight later in order to find out more about conditions in the home. Most of the information made use of in this report, however, was obtained a year later, when a further visit was made to the patient and relatives by the sociologist, and the patient's G.P. was interviewed by a psychiatrist (C. M. P.). All patients readmitted during the year were seen in hospital shortly afterwards, and their families were re-interviewed at that time in order to obtain details of the events preceding readmission. In addition, a check was made on the case-notes at the end of the year, and, where