effects. Two patients were reported as being more coherent in asking for their needs. On investigation it was found that they felt so ill that they clamoured for the doctor and, although previously mute, asked to have the bedclothes removed: it is doubtful whether this can be looked upon as real improvement.

The nine patients who were worse required so much attention that the routine of the ward was disorganized. One became so violent that she needed to be secluded. One of the oligophrenics began to bite and fight. She had a tendency to behaviour of this type but had been controlled on chlorpromazine. The other oligophrenic was extremely nervy and agitated. Two patients were too restless to work, another became depressed, and one was continually stripping herself and her bed. Others were restless and shouting, and one threw the chairs she dusted about and broke them.

Those who showed no marked change were worried in three cases by the side-effects.

Summary and Conclusions

A short pilot trial of the drug stelazine was undertaken with 25 chronic psychotic patients. Marked side-effects, chiefly of the Parkinson type, were apparent. To these benzhexol hydrochloride gave partial relief.

With the dosage used, the side-effects of stelazine were so marked and unpleasant that it is doubtful whether the drug would be acceptable for routine use. In some cases the adverse effect on behaviour has been such that its reliability is in question. Higher dosage is unlikely to be helpful in view of the side-effects already encountered. In view of the lag of time between stopping the drug and the subsidence of side-effects, it would appear that the drug is cumulative in the body. The amount of improvement in a few cases was not sufficient to encourage further use of the drug.

I thank Messrs. Smith Kline and French Ltd. for the supply of stelazine; Dr. I. Atkin, physician-superintendent of Park Prewett Hospital, for his encouragement and advice; and the nursing staff of C ward for unfailing help in this work.

PROGNOSIS OF CEREBRAL EMBOLISM IN RHEUMATIC HEART DISEASE

BY

G. KEEN, M.B., F.R.C.S.

Surgical Registrar

AND

V. M. LEVEAUX, M.D., M.R.C.P.

*Research Assistant to the Cardiac Department,
Westminster Hospital, London*

Cerebral embolism is a well-recognized complication of rheumatic heart disease. Wood (1954) reported an incidence of 13% of systemic embolism in 300 cases of mitral stenosis, and the site of the embolism was cerebral in three-quarters of these. Of 150 patients undergoing mitral valvotomy (Sellors *et al.*, 1953), five suffered a cerebral embolism; two died within 12 hours, two remained permanently hemiplegic, and one recovered.

Brain (1955) considered that cerebral embolism, as such, was rarely a fatal condition unless the embolus lodged in the internal carotid artery. Harris and Levine (1941), however, reported that one-third of 72 patients with mitral stenosis complicated by cerebral embolism died within a few days or weeks of the latter. Daley *et al.* (1951) found that 49% of 130 patients with rheu-

matic heart disease suffered from cerebral embolism. They concluded that the mortality of this complication was high, and that the residual disability was often severe and crippling in those who survived.

Present Investigation

The present investigation is concerned with the prognosis of cerebral embolism in rheumatic heart disease, and is based on records of patients under the care of members of the consultant staff of Westminster Hospital.

Of a total of 172 patients with rheumatic heart disease, 34 (20%) have been accepted as having shown evidence of cerebral embolism or having a convincing history of this complication. One of these embolic cases has eluded follow-up, and the detailed analysis is of the remaining 33 patients, in whom 39 embolic episodes were recorded.

Of these 33 cases, 28 had dominant mitral stenosis, 1 dominant mitral incompetence, and 4 an admixture of stenosis and incompetence. Aortic valve disease occurred in 8 cases. At the time of the first embolus atrial fibrillation was present in 29 cases, the remaining 4 being in normal rhythm. There were 27 females and 6 males, with ages ranging from 18 to 66 years, average 42.3 years. No attempt has been made to assess the relationship between mitral valvotomy and cerebral embolism. For completeness, however, it is recorded that only three embolic episodes occurred after valvotomy—two immediately and one six hours later. These survived and were followed up for seven months, nine months, and four and a quarter years. Eleven cases coming to valvotomy had had previous cerebral emboli, but none of these had subsequent embolic episodes.

The details of the analysis are as follows:

Main disabilities resulting from 39 embolic episodes: hemiparesis: mild 8 (4 right, 4 left), moderate 16 (11 right, 5 left), severe 10 (3 right, 7 left); aphasia accompanied right hemiparesis in 14, and left hemiparesis in 3. Atypical episodes: (1) dysarthria with euphoria, (2) brief unconscious attack followed by numbness of left arm, (3) transient dysphasia, (4) nominal aphasia, (5) faintness. In addition, hemi-anaesthesia was noted in two cases and hemianopsia in one.

The probable site of embolism in 34 episodes was left hemisphere in 18 and right hemisphere in 16.

The degree of recovery in 39 episodes was: full or almost full in 26, moderate in 6, and slight or nil in 2; and 5 patients died within one month (1 was a case of malignant melanoma).

The time interval to the commencement of recovery in 22 episodes ranged from 0 to 21 days, average 5.5 days. Six further cases were noted to begin recovery within "a few" days or weeks.

The time interval to maximum recovery in 23 episodes was: up to 1 week in 8, 1-6 weeks in 6, 6-12 weeks in 2, 3-6 months in 2, 6 months to 1 year in 4, and 1-2 years in 1; the average was 130 days.

The duration of the follow-up from the first embolic episode is shown in the Table.

Duration of Follow-up in 33 Cases from First Embolic Episode

Time:	Up to 2 w.	2 w. to 3 m.	3 m. to 1 yr.	1-2 Yr.	2-3 Yr.	3-4 Yr.	4-5 Yr.	5-6 Yr.	6-7 Yr.	7-8 Yr.	8-9 Yr.	9-10 Yr.	10-11 Yr.	11-12 Yr.	17 Yr.
Total No. ...	4	1	6	4	3	4	3	1	2	1	0	2	0	1	1
No. followed to death	4	1	1	1	1	1	0	0	0	0	0	0	0	0	0

Average duration of follow-up, 3.8 years.

Discussion

In this series of 172 cases of rheumatic heart disease cerebral embolism complications occurred in 34, the right and left cerebral hemispheres being involved with almost equal frequency. Hemiparesis was the major resultant disability, being severe in 10 episodes, moderate in 16, and mild in 6. Aphasia accompanied right hemiparesis in 14 episodes and left hemiparesis in 3.

Recovery was full, or almost so, in 26 of 39 episodes (67%), moderate in 6, and slight or nil in 2 patients followed up for 10 and 12 years respectively. Four patients died within two weeks of a single embolism. One patient who had made a complete recovery from two previous embolic episodes occurring within a short time died nearly two years later, within a month of her third embolism, and had also malignant melanomatosis. Four other cases followed to their death survived nearly four years, two and a half years, eight months, and three months respectively after their embolus. Clinical recovery commonly began immediately after the embolism, or could be delayed for as long as three weeks. On the average improvement began by the end of the first week.

Maximum recovery was achieved by some patients within hours or days, but progressive improvement was observed to occur in individual cases for a year or more. In the average case maximum recovery was reached after a period of four months. Although no cases of associated epilepsy such as those described by Baker and Finnegan (1957) occurred in this series, they might occur if observation were continued over a longer period.

Summary

Cerebral embolism occurred in 34 out of 172 patients (20%) with rheumatic heart disease.

Thirty-three cases are analysed, with the following results: (1) less than one-fifth died within three months; (2) two-thirds of the patients made a virtually full clinical recovery; (3) the average time to the beginning of recovery was one week, and to maximum recovery four months.

The hopeful outlook for patients with this complication of rheumatic heart disease as regards neurological recovery is stressed.

We thank Sir Clement Price Thomas and Dr. C. J. Gavey for their encouragement and criticism of this investigation, and the members of the staff of Westminster Hospital whose cases we have studied.

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Medical Memorandum

Acute Haemolysis Following P.A.S.

A woman aged 24 was admitted to the National Iranian Oil Company Hospital, Abadan, on October 6, 1957. For the previous five months she had been an in-patient in an isolation hospital on account of sputum-positive bilateral pulmonary tuberculosis. There was infiltration in the right upper zone and the left upper and middle zones. On the left side there was also marked fibrosis, and several large cavities could be seen. During the five months of treatment the sputum had remained positive, acid-fast bacilli being found on August 11 and October 3. The haemoglobin on August 11 was 14.6 g./100 ml. (95%).

Treatment had consisted of streptomycin and isoniazid only, but on the morning of October 4 she had been given 6 g. of P.A.S. in solution by mouth. An hour or two later she felt weak, experienced epigastric pain, and vomited. She had a sense of suffocation and was restless. No further P.A.S. was given. Her condition remained about the same for the next 24 hours, and on the morning of October 6 she again vomited and noticed that her urine was reddish in colour.

On admission to the general hospital she was restless, was sweating profusely, and was so weak that she was unable to sit up in bed. Her temperature was 99.6° F. (37.5° C.), pulse 100 a minute and weak, and B.P. 70/0. She was extremely pale and there was marked icterus of the skin and conjunctivae. The liver and spleen were not palpable, but the uterus was enlarged to the size of a 20-weeks pregnancy. The urine was reddish in colour and contained a large amount of albumin, many casts, and a few pus cells and red cells. The test for occult blood was strongly positive, but no bile could be detected. The haemoglobin was 3.7 g./100 ml. (24%), colour index 0.8, and W.B.C. 22,000/c.mm.; the bleeding, clotting, and prothrombin times were normal. There were 6 normoblasts per 100 leucocytes and the blood group was O.

She was immediately transfused with 2 pints (1,140 ml.) of group O blood. The next day the urine contained a large quantity of albumin, red cells, and pus cells, and on October 8 the haemoglobin was 5.3 g./100 ml. (34%), while the urine was free of albumin. The jaundice faded rapidly, and on October 10, four days after admission, the serum bilirubin was 0.3 mg./100 ml. On October 12 the haemoglobin was 6.3 g./100 ml. (40%) and reticulocytes 4%.

"Imferon," 100 mg. by intramuscular injection daily, was started on October 14, and during the next five weeks the haemoglobin rose to 11 g./100 ml. (70%), her general condition improved greatly, she gained 6 lb. (2.7 kg.) in weight, and she felt foetal movements for the first time. From admission until this time no chemotherapy had been given at all.

In view of the fact that the sputum had remained positive for acid-fast bacilli during the whole of the treatment with streptomycin and isoniazid, it was thought desirable to give her P.A.S., and it was decided to attempt to desensitize her. This was started on November 16 with 1/100 g. by mouth. Thereafter the daily single dose was doubled and the haemoglobin estimation carried out each day. After eight days the dose was 1 g., and during the following six days this was raised to 3 g. six-hourly, during which time the haemoglobin rose to 12 g./100 ml. (76%). At the beginning of the course of P.A.S. the sputum was still positive for acid-fast bacilli.

COMMENT

It would appear that an acute haemolysis began an hour or two after a single dose of 6 g. of P.A.S. given orally for the first time. This was so severe that it reduced the haemoglobin to 3.7 g./100 ml. (24%) during the next 48 hours. The fact that the serum bilirubin was normal four days later suggests that the haemolysis stopped as abruptly as it had begun. Immediate treatment with 2 pints (1,140 ml.) of blood followed by imferon, 100 mg. daily, raised the haemoglobin to 12 g./100 ml. (76%) over the next six weeks, during which time there was no evidence of further haemolysis. By starting with a very small dose of P.A.S. it was possible to raise this to 12 g. a day without any ill effects.

It remains to be seen whether P.A.S. will be any more effective than streptomycin and isoniazid in rendering the sputum negative for acid-fast bacilli. It is interesting that the foetus survived the period of extremely low haemoglobin level.

I thank Dr. M. Rouhani, principal medical officer, N.I.O.C., Abadan, for permission to publish this report.

H. A. K. ROWLAND, D.M., M.R.C.P.Ed., D.T.M.&H.,
 National Iranian Oil Company Hospital, Abadan, Iran.

At the leprosy research centre attached to the Vellore Christian Medical College and Hospital in South India, a team of workers is engaged in the rehabilitation of those cured of leprosy. Their most striking success has been in the reconstructive surgery of claw hands. Mr. PAUL BRAND, F.R.C.S., director of orthopaedics to the Mission to Lepers, described this work at a recent meeting in London of the Friends of Vellore.