case being about 150% of values for blood leucocytes. This finding suggests that many of the cells of the pernicious-anaemia marrow are of proliferative type and are engaged in building up D.N.A. in preparation for mitosis.

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CEREBROVASCULAR ACCIDENTS IN HOSPITALS FOR ACUTE CASES

BY

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Patients with intracranial vascular lesions, especially those over 70, are a serious problem to the general practitioner called upon to arrange suitable care and accommodation. Hospitals are unwilling to admit cases likely to remain as chronic hemiplegics occupying acute medical beds for long periods. Those who do get admitted are often accepted with reluctance after tedious negotiations which are irritating to both house officers and practitioners. The attitude of hospital staffs would be easier to defend if it were not based as much on traditional prejudice as on an appreciation of what actually happens to these cases after admission.

This paper reports an analysis of 239 cases admitted after cerebrovascular accidents in which the length of stay in hospital and the eventual disposal have been investigated.

Material and Methods

The in-patient records of two hospitals were examined for the two-year period 1948-9. Extracts of age, sex, length of stay, and disposal were made of all cases admitted with the diagnoses of cerebral haemorrhage, thrombosis and embolism, subarachnoid haemorrhage, hemiplegia, and coma of unknown cause. The 239 cases collected were analysed with respect to length of stay in hospital by age and sex. The duration of symptoms before admission was not studied in detail, but only three of the cases were admitted as long-standing hemiplegias and the majority were victims of recent cerebrovascular accidents.

The two hospitals selected are situated in a large industrial county town in the midlands of England. Hospital A is an ex-voluntary hospital of over 600 beds with a casualty department. Hospital B is an ex-municipal hospital of 400 beds with no casualty department. Between them the two hospitals accommodate most of the acute medical admissions from a population of 600,000.

Results

Table I summarizes the patients with intracranial vascular lesions admitted to the two hospitals. Of the 239 patients 165 (69%) died in hospital and 74 (31%) were discharged. Of the discharges 61 (25.5% of admissions) were sent home, and 13 (5.4% of admissions) were transferred to other hospitals.

TABLE I.—Summary of 239 Cases with Intracranial Vascular Lesions Admitted to Hospital in 1948-9

	Hospital A			Hospital B			Total		
	Men	Women	Total	Men	Women	Total	Men	Women	Total
Discharged home	10	17	27	12	22	34	22	39	61
Transferred	6	3	9	4	—	4	10	3	13
Died	34	55	89	27	49	76	61	104	165
Total	50	75	125	43	71	114	93	146	239

Cumulative frequency diagram showing the percentage of patients remaining in hospital, discharged, or dead after a given period of time.

The length of stay in hospital is shown in the form of a cumulative frequency diagram. Over 30% of admissions died in the first two days. By the end of 10 days 54.2% had died and 5% had been discharged, leaving 40.8% still in hospital. After six weeks 67.6% had died, 21.8% had been discharged, and 10.6% remained. Only 3.8% stayed in hospital more than 12 weeks.

Table II gives the length of stay in hospital according to age. Of those over 60 years old 10 out of 141 (7.1%) stayed in more than six weeks, compared with 14 out of 98 (14.3%) of those under 60. The difference between these percentages is not significant. The number of deaths in the higher

TABLE II.—Length of Stay in Hospital According to Age. Discharges by Death are Given in Parentheses

Week of Discharge	Age Group						
	20-29	30-39	40-49	50-59	60-69	70-79	80-89
1-2	3 (2)	3 (3)	16 (13)	35 (28)	58 (54)	40 (37)	8 (8)
3-4	—	1	7 (2)	10 (3)	8 (3)	6 (4)	2 (2)
5-6	—	1	6	2	5 (2)	4	—
7-8	—	—	1	3	1	—	—
9-10	—	1 (1)	1	3 (1)	3 (1)	—	1
11-12	—	—	—	1 (1)	1 (1)	—	—
Over 12	—	1	—	4	3	1	—
Total	3 (2)	7 (4)	31 (15)	57 (32)	79 (61)	51 (41)	11 (10)

age groups is, however, significantly greater than in the younger groups ($\chi^2=21.53$; $df=6$; $P<0.001$).

Table III shows the percentage of medical beds occupied by patients with intracranial vascular lesions. The number of beds occupied by chronic cases, those who have been in

TABLE III.—Percentage of Medical Beds Occupied by Intracranial Vascular Lesions

	Men		Women	
	Hospital A	Hospital B	Hospital A	Hospital B
All cases	1.47	2.13	3.07	4.08
Cases in hospital more than:				
2 weeks	0.51	1.26	1.53	2.62
4 "	0.26	0.73	0.93	1.87
6 "	0.18	0.45	0.59	1.26
8 "	0.14	0.29	0.37	1.01
10 "	0.10	0.17	0.27	0.77
12 "	0.06	0.14	0.17	0.59

hospital more than a given time, is also indicated. From this table can also be estimated the proportion of beds saved by transfer of cases after, say, three or four weeks to a special hemiplegic unit.

Discussion

It is surprising to find that less than 5% of patients with intracranial vascular lesions became chronic hospital patients, and these occupied only a small proportion of the total medical beds. Patients over 60, because of the high mortality in this group, were not especially liable to become chronic cases. In fact, it was the younger groups which provided the largest number of long-term cases, probably owing to their greater ability to survive grossly disabling lesions.

The most striking feature of this series was the extremely high death rate in the first few days after admission. The expectation of survival increased rapidly with the age of the lesion. Hospitals which accept early cases, particularly those with casualty departments where patients with sudden apoplexy are taken from the street, can expect a large intake, a high mortality, and a rapid turnover, with relatively few chronic survivors. Those which accept late cases will have a smaller intake, a low mortality, and a long average stay in hospital. For this reason the experience of some hospitals may differ considerably from the two which have been studied in this investigation. What the present series does show is that a generous acceptance of early cases is not necessarily followed by an accumulation of chronic hemiplegics.

There are good reasons why cerebrovascular accidents should be admitted to hospital as soon as they occur, irrespective of the age of the patient or other social factor. Rehabilitation must be started early if it is to prevent permanent disability from contractures (Rusk and Taylor, 1952). Old people must be forced to help themselves before they become reconciled to a life of bed-fast dependence. Such treatment is more effectively carried out in hospital than in the patient's own home. Denial of hospital facilities in these circumstances is likely to add to the number of helpless cases at large in the community, and in the long run actually increase the demand for their accommodation in beds for acute cases.

Summary

The hospital records of 239 cases admitted to hospital following cerebrovascular accidents have been examined.

Less than 5% remained in hospital more than three months. Patients over 70 were not especially liable to become chronic hemiplegics.

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VALUE OF SERUM IRON LEVELS IN ASSESSING EFFECT OF HAEMATINICS IN THE MACROCYTIC ANAEMIAS

BY

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The serum iron shows specific variations in different types of anaemia (Riecker, 1930; Powell, 1944; Laurell, 1947; Cartwright and Wintrobe, 1952). It is low when the cause is iron deficiency, infection, or malignancy. Higher values than normal usually occur in the macrocytic anaemias and in those due to haemolysis or hypoplasia of the bone marrow. Moore and Doan (1937) reported two cases of pernicious anaemia in which the initial high figures of serum iron fell to a low level during a remission. The following is a study of the variations of serum iron before and after treatment in the macrocytic anaemias. It was thought that a definite correlation between an early fall in serum iron and effective therapy might provide a quick and simple method of assessing the effect of a haematinic in the macrocytic anaemias.

Material and Methods

Macrocytic anaemias of all types, such as pernicious anaemia, the sprue syndrome, liver disease, and pregnancy, were studied. The patients were treated by an injection of a haematinic, usually vitamin B₁₂ or folic acid, in hospital. The response in the blood was measured by the rise in erythrocytes after 15 days (Ungley, 1949) and by the reticulocyte count.

The blood for serum iron estimation was always taken at about 10 a.m. to avoid errors due to the diurnal variation (Vahlquist, 1941; Hoyer, 1944; Hamilton *et al.*, 1950). Modern methods for serum iron determination (Laurell, 1947; Vannotti and Delachaux, 1949) are simple and accurate. A fastidious cleanliness is needed, as iron is a common contaminant; so that all-glass syringes and specimen tubes, dry sterilized and specifically cleaned, are used for taking samples of blood. The following technique, adapted by P. W. Perryman (1948, personal communication), has been used.

In a centrifuge tube is placed 4 ml. of serum, to which 1 ml. of 6 N HCl is added, mixed well, and left to stand for ten minutes. Then 3 ml. of 20% trichloroacetic acid is added, stirred with a glass rod, left for 5 minutes, and centrifuged at high speed for approximately 20 minutes. (A longer period may be necessary if particles are still present when the supernatant fluid is drawn off.) Then 4 ml. of supernatant fluid is placed in a glass-stoppered tube and approximately 50 mg. of ascorbic acid added and the solution left for 10 minutes, with occasional shaking to encourage the ascorbic acid to dissolve. Finally, 0.5 ml. of α -dipyridyl in 0.1 N HCl, or 1 ml. of 0.1% orthophenanthroline, and 0.5 ml. of concentrated ammonia solution, are added. The tubes must be agitated well immediately on adding these last two solutions. 1 ml. of doubly distilled water is added to bring the final solution to 6 ml. for the cell of the spectrophotometer (Unicam, S.P.500). The blank consists of 3 ml. of doubly distilled water, 0.5 ml. of 6 N HCl, 1.5 ml. of 20% trichloroacetic acid, then ascorbic acid, reagent, and ammonia solution as above.

Calibration curves were prepared by making known solutions of ferrous ammonium sulphate, through the range of 50 to 500 μ g. per 100 ml., and putting them through the same process as for serum. If, for other reasons, it is desirable to avoid using strong ammonia in the laboratory,