FACTORS INFLUENCING READMISSION TO HOSPITAL:

II. PARAPLEGIA

By I. G. BURNSIDE, M.A., M.Sc. and J. B. COOK, M.D., F.R.C.P.

Yorkshire Regional Spinal Injuries Unit, Centre for Neurology, Neurosurgery and Neurological Trauma, Pinderfields Hospital, Wakefield, England

Abstract. This study of 200 paraplegics shows that occupational status at the time of becoming paralysed exerts as great an influence upon readmission to hospital as does the level or the extent of the lesion and that the effect of the level of the lesion on readmission to hospital increases with lower occupational status.

Key words: Readmission; Hospital; Paraplegia; Occupation; Social class.

Introduction

ALL patients with spinal cord paralysis have in common the risk of illness resulting from urinary complications and skin ulceration but there is an impression that some individual patients are readmitted to hospital frequently, whereas others are readmitted seldom. The tetraplegic patient is largely and almost totally dependent upon the care of others for the maintenance of his well-being although his brain is intact, and that is his only means of influencing the standard of his care and of his environment. Burnside and Cook (1976), investigating factors influencing readmission to hospital in tetraplegia, showed that it was only age and the occupational status of the patient at the time of paralysis that were related to readmission to hospital and of those two factors, the occupational status had the greater effect.

As compared with the tetraplegic, the paraplegic has greater independence and his own self-reliance is a greater factor in influencing the standard of his care whereby the complications and illnesses to which he is prone can be avoided. An investigation of 200 surviving paraplegics of working age has therefore been undertaken to ascertain the factors influencing readmission to hospital in paraplegia and to compare them with those already found to act in tetraplegia.

Material and Methods

The records of 200 patients with spinal cord paralysis causing paraplegia, admitted for the first time to the Yorkshire Regional Spinal Injuries Centre, were reviewed. The spinal cord paralysis in 154 was due to trauma and in 46 the case was not traumatic. Female paraplegics were included only if they had been working at the time of becoming paralysed, and there were 12 of them.

The paraplegics were all of working age at the time of paralysis, the range being from 16 years to 64 years.

The patients were grouped according to severity and level of paralysis as follows: high (T1-T6), 33; mid (T7-T12), 73; low (L1 and below), 61; partial, 33.

There was no significant difference of distribution of level between traumatic and non-traumatic paraplegia and there was no relationship between the age of the patient and whether the paraplegia was due to trauma or not.

The paraplegics were classified according to 'Classification of Occupations' (1970) of the Office of Population Censuses and Surveys. The previous edition of that publication (1959) had put coal-miners into category IV—'Partially skilled', whereas in the 1970 edition, they appear in category IIIM—'Skilled'. The paraplegic patients under investigation came from a wide area of the north of England including a heavily populated urban community with a large coal-mining sector and a more widely dispersed rural community. Over the period studied the admission rate for paraplegia in coal miners had decreased dramatically in relation to other occupations: 1950 to 1959, 44 per cent; 1960 to 1969, 17.2 per cent; 1970 to 1975, 6.7 per cent.

Because of the decrease in admission rate and because of the change of classification affecting coal-miners, it was decided to place them in a separate occupational category. The four categories of occupation used were therefore as follows: non-manual (II and IIIN), 37; skilled manual (IIIM), 79; coal-miners, 34; partially skilled manual and unskilled (IV and V), 50.

A comparison between traumatic and non-traumatic paraplegia showed a difference of distribution by occupation due to traumatic paraplegia being more common in manual and unskilled occupations ($\chi^2 = 22.11$, $df = 3$, $P = 0.001$).

The percentage of each occupational group with traumatic paraplegia was as follows: non-manual, 51 per cent; skilled manual, 81 per cent; coal-miners, 97 per cent; partially and unskilled, 72 per cent.

A comparison between readmission rates in traumatic and non-traumatic paraplegia showed no significant difference ($\chi^2 = 4.1$, $df = 3$, $P = \text{N.S.}$) and therefore the two groups were combined for analysis.

The readmission rate by occupation was considered not only according to whether or not there had been readmissions, but by the number of readmissions for each paraplegic. For this investigation the paraplegics were grouped as follows: no readmissions, 94; one readmission, 50; two readmissions, 32; three or more readmissions, 24.

A comparison of those not readmitted with those readmitted once or more than once, showed no significant difference by occupation ($\chi^2 = 3.2$, $df = 3$, $P = \text{N.S.}$) but an analysis by occupation of the distribution of those with more than one readmission showed a significantly greater rate of readmission in the unskilled group ($\chi^2 = 20.18$, $df = 9$, $P = 0.02$) as demonstrated in Fig. 1, which shows that those paraplegics requiring frequent readmission came from the mining and unskilled occupations.

The paper relating to readmission in tetraplegia (Burnside and Cook, 1976) showed a similar trend but it could not be demonstrated statistically because of the smaller number of tetraplegics.

In paraplegia there was a relationship between severity of injury and readmission, partial lesions being in general readmitted less frequently than complete lesions and there was a relationship with level in that high lesions were readmitted more frequently than low ones. Partial lesions were readmitted less frequently than even the lowest lesions. An analysis of the groups, partial, low, mid and high lesions, in relation to numbers of readmissions was made ($\chi^2 = 21.41$, $df = 9$, $P = 0.02$), and is shown in Fig. 2.

There was no significant relationship between severity or level of lesion and occupational status ($\chi^2 = 10.11$, $df = 9$, $P = \text{N.S.}$) but from Fig. 2 it appears that the effect of the level of the lesion on readmission increases with lower occupational status.

Burnside and Cook (1976) found a significant relationship in tetraplegia

FIG. 1

Percentage of each occupational group having 0, 1, 2 or 3+ readmissions.

between age and readmission rate in that younger patients were admitted more frequently. In the present study there was a similar trend but it could not be established statistically ($\chi^2=7.31$, $df=9$, $P=N.S.$). It was found that younger paraplegics tended to have higher and complete lesions ($\chi^2=24.1$, $df=12$, $P=0.02$). The observed relationship in paraplegia between high lesions and high readmission rate may possibly mask the effect of age.

Discussion

As demonstrated by Burnside and Cook (1976) in tetraplegia, occupational status at the time of development of paralysis in paraplegia is a major influence on readmission to hospital, exerting as great an effect as the level and extent of the lesion. Using terms defined by Harris (1971): impairment—'lacking part or all of a limb or having a defective limb, organ or mechanism of the body'; and handicap—'the disadvantage or restriction of activity caused by disability'; it could be said that this study demonstrates that, in paraplegia, handicap arising from impairment is enhanced by low occupational status.

FIG. 2

Effect of lesion level (P = partial, L = low, M = mid, H = high) on percentage of each occupational group readmitted on one or more occasions.

Forster (1976) from his study into social class difference in sickness and general practitioner consultations, concludes that the lower occupational groups have higher rates than the upper groups, particularly in chronic sickness, but he points out that such a study cannot answer the question of whether a low social group predisposes a person to chronic sickness or vice versa. In the present study on paraplegia, this problem does not arise because the occupational status is that which appertained to the healthy state before paralysis and it is the occupational status of the person in health which nevertheless determines readmission to hospital following spinal cord paralysis.

Hart (1971) drew attention to the large differences in the quality and accessibility of medical resources to deal with morbidity. The present study does not provide any information relating readmission to hospital to quality or extent of medical services available to the patient in the community, but Forster (1976) points out that it is the lower occupational groups who draw upon the community medical services most frequently.

It is probable that neither of these factors are of relevance to the readmission rates demonstrated by the investigation in paraplegia because in the majority of cases admission was for pressure ulceration in the skin which demands admission to hospital in any occupational group and the prevention of which depends largely

upon the patient's way of life and adherence to simple rules of self-care rather than upon the provision of primary medical care. Reviewing the results in more detail shows that there is no difference by occupational status in those having only one readmission. The difference occurs in those having more than one readmission, which may suggest that the higher occupational groups learn from experience to manage their condition more efficiently.

In studies on the use of Health Service resources there is a tendency to confuse financial position with occupational status, the suggestion being that it is poverty which produces the need for Health Service care. However, the study on paraplegia showed that industrial injuries were more common in the lower occupational groups and it is commonly the case that industrial injuries carry large sums in compensation and that those who suffer industrial injuries are not financially deprived.

In a leading article the *British Medical Journal* (1977) in relation to surgical services, quoted the old engineering design law, the 20-80 rule, which states that 20 per cent of the people do 80 per cent of the work. They commented further that the same rule is said also to apply to the use of the social services. Figures for spinal cord analysis and particularly those for tetraplegia suggest that this may be so.

As in tetraplegia, the influence of occupational status upon readmission to hospital indicates a social trend without providing any ready answers but the findings give cause to consider the function and use of resources in the health and welfare services.

RÉSUMÉ

Une étude de deux cent paraplégiques a montrée que l'état d'occupation du malade au temps de sa paralysie exerçait une influence sur le ré'admission à l'hôpital aussi forte que l'étendue ou le niveau de la lésion. L'effet du niveau de la lésion est d'autant important que l'état d'occupation est bas.

ZUSAMMENFASSUNG

Dieser Bericht über 200 Paraplegiker zeigt dass die Berufsstellung zur Seit der Lähmung so wichtig einen Einfluss auf die Wiederzulassung ins Krankenhaus wirkt als die Höhe oder die Ausdehnung der Läsion. Der Bericht zeigt auch dass die Wirkung der Höhe der Läsion auf die Wiederzulassung ins Krankenhaus bei niederen Berufsstellung stärker wird.

REFERENCES

- British Medical Journal* (1977). Surgeons and the 20-80 rule, 1, 2.
 BURNSIDE, I. G. and COOK, J. B. (1976). Factors influencing readmission to hospital: I. Tetraplegia. *Paraplegia*, 14, 220-224.
 FORSTER, D. P. (1976). Social class differences in sickness and general practitioner consultations. *Health Trends*, 1, 29-32.
 HARRIS, A. I. (1971). *Handicapped and impaired in Great Britain*. H.M.S.O., London.
 HART, J. T. (1971). The inverse care law. *Lancet*, 1, 405-412.