

Treatment of Neurogenic Bladder Dysfunction in Multiple Sclerosis by Ultrasound-Controlled Bladder Training

A Follow-Up Study

K.-J. Christ and H. H. Kornhuber

Abteilung für Neurologie der Universität Ulm, Steinhövelstraße 9, D-7900 Ulm,
Federal Republic of Germany

Summary. Neurogenic bladder dysfunction, the main cause of chronic urinary tract infections in multiple sclerosis (MS), is efficiently treated by bladder training with ultrasound control of the residual urine. However, the beneficial effects of bladder training in the hospital are often lost within a short time when the patient returns to his home. Reexamination at home of 97 MS patients with increased residual urine and/or chronic urinary tract infections showed that the group which claimed to continue bladder training at home had significantly less residual urine at home than the group which did not continue bladder training at home. The residual urine decreased from 210 ml on average to almost normal while the patients did bladder training in the hospital, but the volume nearly doubled within a short time at home. Thus, more decentralized rehabilitation by family members, volunteer personnel or local nurses is necessary. Decentralized symptomatic therapy is the most efficient treatment of MS at present. Family members, volunteers, and local nurses, however, need training. Without these improvements in decentralized rehabilitation the hospital treatment of MS is of little benefit because urinary tract infection quickly recurs at home. For efficient bladder training the patient needs feedback regarding the residual urine; this can be provided with minimum risk by ultrasound sonocystography. In those rare cases in which bladder training does not work, intermittent catheterization must be carried out by the patients or their families, volunteer personnel or a local nurse. A continuous indwelling catheter should not be used. Antibiotic treatment should be applied only on the basis of a precise bacteriological diagnosis.

Key words: Multiple sclerosis – Bladder dysfunction – Treatment – Bladder training.

Zusammenfassung. Neurogene Blasenstörungen sind die Hauptursache der chronischen Harnwegsinfekte bei der Multiplen Sklerose (MS); sie können wirksam behandelt werden durch Blasentraining mit Kontrolle des Restharns.

Offprint requests to: Dr. K.-J. Christ (address see above)

Die günstige Wirkung des im Krankenhaus erlernten Blasentrainings geht jedoch oft binnen kurzer Zeit verloren, wenn der Patient nach Hause zurückkehrt. Eine Nachuntersuchung zu Hause von 97 MS-Patienten mit erhöhtem Restharn und/oder chronischem Harnwegsinfekt zeigte, daß jene MS-Krankengruppe, die bei der Aufnahme erhöhten Restharn hatte und angab, daheim das Blasentraining fortgesetzt zu haben, signifikant weniger Restharn hatte als jene Krankengruppe, die zugab, das Blasentraining zu Hause nicht fortgesetzt zu haben. In jener Gruppe von Kranken mit erhöhtem Restharn bei Aufnahme, die zu Hause das Blasentraining nicht fortgesetzt hatten, war der Restharn während der Krankenhausbehandlung durch Blasentraining von 210 ccm im Mittel auf fast normale Werte gesunken, aber zu Hause stieg der Restharn in kurzer Zeit wieder auf fast das Doppelte. Deshalb ist mehr dezentrale Rehabilitation unter Mithilfe von Familienmitgliedern, Gemeindeschwestern und freiwilligen Helfern nötig. Dezentrale symptomatische Therapie und Rehabilitation ist gegenwärtig das Wirksamste, was zur Besserung der Situation der MS-Kranken getan werden kann. Die Familienmitglieder, Helfer und Gemeindeschwestern brauchen aber praktische Ausbildung. Für wirksames Blasentraining bedarf der Patient einer Rückmeldung über den Restharn; diese ist risikofrei durch Ultraschall (Sonocystographie) zu erhalten. In denjenigen Fällen, in denen Blasentraining nicht ausreichend hilft, ist intermittierendes Katheterisieren durch den Patienten, Familienmitglieder oder die Gemeindeschwester angezeigt. Ein Dauerkatheter sollte vermieden werden. Antibiotische Behandlung ist nur auf Grund bakteriologischer Diagnose indiziert.

Schlüsselwörter: Multiple Sklerose – Blasenstörungen – Behandlung – Blasentraining.

Introduction

A causal treatment of multiple sclerosis does not yet exist. Symptomatic treatment, rehabilitation, and prevention of secondary complications are, therefore, most important for the management of MS [2, 3, 4]. Chronic urinary tract infections resulting from neurogenic bladder dysfunction occur in one-third of the male MS patients and more than half of the female MS patients admitted to our hospital [1, 4]. A residual urine of 80 ml or more is associated with chronic cystitis in 97% of the female patients and in 62% of the male patients. If the infection results in the formation of bladder stones or even renal stones, it becomes impossible to cure the infection without removing the stones. Almost 90% of MS patients die directly or indirectly from infections [6]. Among these infections, pneumonia is predominant in the terminal stage, whereas chronic cystopyelitis is the single secondary disease in MS that torments the patient and his family most of the time.

Removal of bladder stones, correction of descensus uteri, antibiotic treatment based on bacterial resistance, and especially bladder training with feedback from noninvasive ultrasound determination of the residual urine [5] can cure cystopyelitis during hospital treatment and reduce residual urine to normal in

most cases. It is also essential that the patient drinks enough water, is given large doses of ascorbic acid in the case of alkaline urine, and urinates in the standing or sitting (rather than lying) position. Many MS patients were readmitted to our hospital for different reasons. It was obvious that at home success with cystopyelitis due to our previous treatment was soon lost. Therefore we decided to investigate this problem by measuring residual urine in MS patients at home¹.

Patients and Methods

Ninety-seven MS patients were investigated at home. The patients had been admitted to our hospital (Neurologische Klinik Dietenbronn) from 1975 to 1978. Only those patients were selected who had a chronic urinary tract infection at admission or increased residual urine (60 ml or more). An additional criterion of selection was that the patient's home was within 100 km from our clinic. The neurological symptoms, the patient's complaints, and the social and occupational situation were documented. The social data will be reported elsewhere. Residual urine was measured using sterile catheterization, and the catheter urine was bacteriologically investigated with a Urotube system (Hoffmann—La Roche AG, Grenzach, Federal Republic of Germany). There were 70 female and 27 male MS patients, 23–67 years old, mean 45 years. The average duration of the disease was 15 years. The time interval between discharge from our hospital and reinvestigation at home averaged 14.2 months. The mean time interval between the last relapse and this reinvestigation was 20 months.

Results

Of the 97 patients, 70 had chronic urinary tract infections at the time of their last admission to our hospital. On discharge from the hospital there was still indication of urinary infection in 9 patients. The average residual urine was 156 ml on admission and 65 ml on discharge, the difference being highly significant.

None of the patients had a continuous indwelling catheter on discharge from the hospital. However, nine were found to have continuous indwelling catheters at home. In these nine cases it was not possible to measure the residual urine at home. In 14 other cases it was not possible to measure the residual urine at home because the patients had discontinued bladder training and were consequently not able to urinate. Thus, the sample of the 74 cases in which it was possible to measure residual urine at home was biased toward better bladder function, less residual urine, and less urinary tract infection. In these 74 patients the residual urine averaged 116 ml, almost twice the amount of the residual urine on discharge from the hospital.

The patients claiming continued bladder training at home averaged 100 ml residual urine, while the patients admitting not to have continued bladder training averaged 133 ml residual urine. This difference is significant at the 0.05 level. However, probably some of the patients who claimed to continue bladder training really did not do so. Certainly the group with a continuous indwelling catheter, in which we would expect high residual urine maintained no bladder training at home. Thus, the real difference in residual urine between the two

¹ The financial support for this study from the Hertie Foundation is gratefully acknowledged

groups with or without bladder training at home was higher than we were able to measure.

Urinary tract infections could be detected only from Urotube bacterial counts in this investigation because we had no centrifuge or other equipment with us. But even this restricted information revealed that 43 of the 97 patients had chronic urinary tract infections at home. That is five times more infections than on discharge from the hospital.

From the neurological point of view, the more disabled the patient, the higher the residual urine and the more chronic urinary tract infections. This result from our previous research [1] was again apparent in this reinvestigation at home. Spastic paraplegia especially shows a high positive correlation with increased residual urine.

There was no correlation between the time interval from hospital discharge to reinvestigation and urinary tract infection, but we were able to show that the amount of residual urine depended on this time interval. Of the 97 patients 88 complained of bladder dysfunction such as incontinence, urgency or hesitancy.

Two of the 27 male patients were still employed. Thirty-one of the female patients were housewives and still did some work at home but at a reduced level of activity. 4 of the female patients were still employed, 32 had retired because of their MS.

Discussion

From these results it appears that our hospital treatment with teaching of bladder training and intermittent catheterization is rendered inefficient by inadequate control by family doctors and community nurses of the decentralized, continuous, symptomatic therapy and rehabilitation at home. Moreover, there is usually no feedback by measuring the residual urine at home. In light of these facts it would seem reasonable that the necessary improvements in symptomatic therapy be attempted before resorting to high risk treatment with the immunosuppressive agent Azathioprin or injection of basic myelin protein in MS patients.

Indwelling continuous catheters, still widely advocated for use in neurogenic bladder disturbance, can cause urinary infection and often lesions in the urethra resulting in urethral strictures. An indwelling continuous catheter should not be recommended for neurogenic bladder dysfunction in MS, although it may be necessary after prostatic surgery.

Because of bladder dysfunction with urgency and frequency of voiding, many MS patients tend to drink as little water as possible. This, of course, increases the probability of bladder stones and renal stones. The patients should drink two to three liters per day.

Bladder training is simple and consists of drinking coffee or tea, manual tapping on the bladder region, or letting warm water rinse over the hands and feet. Once micturition has started, the bladder is manually compressed (Credé's maneuver). If this does not adequately reduce the residual urine, parasympathomimetics or alpha blocking agents may be used in addition. Should this combination still prove ineffective, intermittent self-catheterization should be

used. We have several patients who have used intermittent catheterization to their advantage for several years either by themselves or with the help of family members. We prescribe disposable catheters, disposable gloves, and a lubricant.

The care of MS patients by neurologists and family doctors is inadequate. In an effort to improve the situation we gave courses to the community nurses. In Baden-Württemberg we have a well developed system of social stations, each of which has several trained nurses. However, it became apparent that all of the nurses were not trained in neurology and that most of them were quite old and inflexible toward learning sonocystography [5] and its application in decentralized bladder control. The solution is probably to recruit and train volunteer personnel to mediate knowledge to the MS families and provide feedback by sonocystography. The ultrasound sector scan should be provided by the communities.

Furthermore, family doctors must be better trained in the diagnosis of chronic urinary infection by means of Urotube/Uricult methods since many of them still send the urine specimen to the laboratory in a simple tube which gives meaningless results. According to our observations, many family doctors still prescribe antibiotic drugs without bacteriological testing, and the patients often take the antibiotic in small intermittent doses which can only result in growth of resistant bacteria. Thus, antibiotic treatment must be based on unambiguous proof of urinary infection and determination of antibiotic sensitivity, and it must be controlled by the doctor or nurse. Our results show that continuous bladder training at home is of considerable help in keeping the patient socially integrated and employed.

References

1. Conrad, B., Aschoff, J. C.: Der chronische Harnwegsinfekt bei Multipler Sklerose. *Nervenarzt* **43**, 46–50 (1972)
2. Kornhuber, H. H.: Multiple Sklerose: Was kann man heute tun? *Med. Tribune (Basel)* **10** (1977)
3. Kornhuber, H. H.: Symptomatic therapy and rehabilitation in multiple sclerosis. In: Search for the cause of multiple sclerosis and other chronic diseases of the central nervous system, A. Boese (ed.). Weinheim: Verlag Chemie 1980
4. Kornhuber, H. H., Jerusalem, F.: Medizinische Rehabilitation von Kranken mit Multipler Sklerose, pp. 603–606. In: Heidelberger Rehabilitationskongreß 1968. *Arbeitsmedizin, Sozialmedizin, Arbeitshygiene*, Vol. 26. Stuttgart: H. W. Gentner 1968
5. Kornhuber, H. H., Widder, B., Christ, K.-J.: The measurement of residual urine by means of ultrasound (sonocystography) in neurogenic bladder dysfunction. *Arch. Psychiatr. Nervenkr.* **228**, 1–6 (1980)
6. Leibowitz, U.: Progress in multiple sclerosis, research and treatment. New York, London: Academic Press 1972

Received January 3, 1980