Today's Treatment

Diseases of the urinary system

Urinary incontinence in the elderly

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British Medical Journal, 1977, **2**, 754-757

Sheldon¹ defined urinary incontinence as "the involuntary voiding of urine in whatever amount." Agate² refers to urinary incontinence as being "in practical terms the voiding of urine at unsuitable times and elsewhere than in a suitable receptacle." The lexicographers' definitions of incontinence emphasise a lack of self-restraint in a moral sense and thus endorse the shame and repugnance associated with this symptom that as it were compounds the felony and is responsible for much of the sombre psychosocial problem.

Notwithstanding this flavour of moral delinquency and its distressing effects in current Western society with crowded living conditions, fitted carpets etc, the banishment of convenient chamber pots and sanitary pails with the advent of advanced sanitary engineering and bourgeois aspirations, urinary incontinence de novo in an elderly patient should be regarded like mental confusion or falling about merely as a *non-specific symptom* of any illness rather than an inevitable manifestation of aging.

Transient incontinence

Any illness or injury may totally prostrate or immobilise an elderly, frail, or handicapped individual out of reach of a suitable receptacle or unable to reach the lavatory in time. Any illness may produce transient confusion or brain failure accompanied by incontinence in an elderly patient. Any illness or immobilising injury can lead to faecal impaction, which may present with urinary retention and overflow incontinence before leakage of faecal material discloses the cause. These are examples of transient or symptomatic incontinence, which need not persist after the precipitating cause is dealt with. Other examples include cases when acute frequency or polyuria due to diuretics defeats the individual's customary arrangement, or when the individual staying away from home or removed to an institution without familiar receptacles (to accommodate long-standing prostatism or nocturia etc) is caught short. Yet Brocklehurst³ pointed out that one minor incident may produce "established incontinence."

Willington⁴ found that the prevalence of incontinence in hospital fell from 33.6% on admission to 14.2% later. Inclusion of the transient form will exaggerate the long-term problem

but management may be a factor in determining how many potentially transient cases progress to established incontinence—the hard core problem with its heavy price in institutional resources and nursing drudgery, and prodigal expenditure of mechanical ingenuity and disposable materials.

A classificatory distinction between transient and established incontinence is valuable, but not therefore fundamental because it depends on results rather than mechanisms and may confuse containment with prevention and remedy.

Describing an institutional population, Newman⁵ distinguished between true and apparent incontinence. He related the latter to factors such as precipitancy, polyuria, and taking hypnotics, and the former to factors such as neurological disease, trauma, bladder neck disturbance, and dementia. A more fundamental distinction is that true incontinence, which paradoxically is beyond voluntary control, calls for specific remedies such as urological procedures or appliances. Apparent incontinence is spurious, avoidable, and calls for general measures.

Newman linked an important psychological mechanism for apparent incontinence, regression to childhood, and fetal behaviour in institutions with the breakdown of personality shown by Pavlov and developed by Sargant.⁶ He showed vividly how institutional management disrupted an elderly individual's life and how well-intentioned doctors and nurses could commit a series of isolating and degrading assaults on the patient in hospital just as they are made on the minds of political prisoners and others in similar circumstances. The orderly routine of an old lady's life is suddenly completely disrupted: nurses in unfamiliar uniform tell her to do things; white-coated doctors appear and then withdraw without making satisfactory communication with her. She needs a bed pan but the nurse is too busy to give it to her. Her familiar diet and simple medication are unavailable. She has to eat and wash in unfamiliar positions. She is dressed in ugly and unfamiliar clothing. To all this she reacts with emotional breakdown that produces incontinence in the same way as it may do in younger prisoners subject to similar treatment.

Voluntary control of micturition

The physiology of micturition is complex, and the nervous factors are not yet completely unravelled.

The sympathetic innervation to the bladder is derived chiefly from the first and second lumbar ganglia with contributions from the third and fourth. These fibres ultimately unite to form the presacral nerve or superior hypogastric plexus, which lies in front of the bifurcation of the aorta. From this plexus are derived two hypogastric nerves, each of which ends in the vesical plexus on the lateral aspect of the bladder. The parasympathetic nerve supply from the second and third sacral nerves also joins the vesical plexus. It is doubtful if

there is any separately innervated internal sphincter. While there is no dispute that stimulation of the parasympathetic nerves produces micturition by contracting the detrusor muscle, the action of the sympathetic fibres is debatable. Hamberger and Norberg⁷ found sympathetic fibres to be restricted to the muscle fibres of the vesical trigone, which, incidentally, is of mesodermal origin, while the rest of the bladder is of entodermal origin. Some authors claim that there is a sympathetically controlled functional sphincter mechanism at the outlet of the bladder. There is no doubt that sympatholytic drugs increase bladder tone. The role of the external sphincter, which can be voluntarily controlled, is mainly to stop micturition when desired.

Micturition and presumably also the regulation of bladder tone are essentially spinal reflex functions. Like other spinal reflexes they are normally subject to supraspinal influences. The anatomy is imperfectly known but probably both afferent and efferent pathways in the spinal cord lie in the posterior marginal part of the lateral columns of the spinal cord.⁸ The part of the postcentral gyrus lying in the vertex of the cerebral hemisphere is the cortical centre for sensations derived from the bladder, and the corresponding area of the precentral gyrus is probably where motor impulses start micturition. There is probably a relay in the hypothalamus where the central excitatory state is probably built up. The cortex can obviously contribute to or inhibit the central excitatory state on social indications.

In infancy evacuation of the bladder occurs reflexly, the reflex arc running through the sacral region of the cord. The development of control over bladder evacuation is associated with the growth of inhibition of the evacuation reflex, the path of the inhibitory impulses running in the sympathetic nerves, which probably maintains inhibition of the detrusor muscle and possibly closure of the sphincter. At the same time it becomes possible voluntarily to overcome this inhibition and so to start micturating, which is then completed reflexly.

Thus we can recognise three nervous mechanisms controlling bladder function—the sacral reflex arc for evacuation, the inhibitory influences of the sympathetic nerves, and voluntary control overcoming the latter and starting micturition.

Acquisition of incontinence

In the normal child the incomplete development of the central nervous system results in an automatic spinal reflex for both bowel and bladder. The second phase of development depends on behaviour-training, usually carried out at home. The parent wants to reduce the laundry and ensure that her child meets the social requirements of sanitary behaviour in time to avoid the unpleasant consequences of failure for child and parent. This, of course, is pot training, a habit training based on the principles of the conditioned reflex.

The degree of skill demanded from the child and adult is that they should be able to empty the bladder during the filling phase as a precaution against future needs, the anticipatory or opportunistic act of Isaacs.⁹ Normally the final phase of development (cortical inhibition) occurs at about 2 years and needs several years of trial and error by the child before all social catastrophes can be avoided.

Social conditioning and loss of continence

The conditioned reflex skill does not deteriorate with age, and the habit inculcated in youth lasts throughout life, while preoccupation with sanitary hygiene may vary with individuals from an obsession to careless abandon. The general pattern remains imprinted, though cerebral degeneration with consequent defective perception, recent memory loss, loss of mobility etc, will need adaptation, but, since age-related degeneration comes on gradually, such adaptation need not be precipitated and will normally be adequate.

Age alone therefore may alter sanitary habit within the constraints of social conditioning. Illness or injury, however, may precipitately overthrow mechanical toilet adaptation and have to break through social conditioning to produce the inevitable disaster. To take the simplest case, an elderly woman prostrate

with acute illness or absolutely immobilised by injury in an environment she has dedicated her life to keeping clean may have to face the prospect of deliberately soiling this environment. Such conditioning may be so strong a barrier that she cannot consciously commit this outrage. Some escape must be found and the only available means is "dissociative inhibition" or "denial" of awareness in this area.

Denial

The concept of denial,¹⁰ derived to describe the phenomenon of defence of the ego against facing the full meaning of impending death, stroke, and brain damage, nicely fits the case of the socially conditioned individual faced with the devastating psychological impact of incontinence. It explains the bizarre and baffling presentation, all too frequent in hospital and elsewhere, of the patient who seems fully aware of all other aspects of his or her environment except his or her incontinence. This mechanism includes disturbance of central nervous control of bladder function, which in elderly people is too easily assumed to manifest irreversible brain damage. It cannot be too strongly emphasised, however, that this disturbance is functional and therefore reversible. This is an extremely common mechanism or urinary incontinence in elderly patients, so common that it should always be suspected in new cases of persisting transient or symptomatic incontinence. Management depends on improved patient-nurse communication, mutual insight, and the reliable provision on demand of access to an appropriate toilet receptacle, thus enabling the patient to return to satisfactory adaptation back through to the right side of the barrier of social conditioning so that awareness of bladder function can be faced again without unbearable anxiety, fear, and shame.

Thus these two commoner behavioural mechanisms for preventable incontinence can masquerade as the uninhibited neurogenic bladder with structural brain damage. Denial is one, and emotional breakdown in response to institutional care⁵ or institutional neurosis is the other.

THE INDIVIDUAL CASE

Incontinence often features as the main complaint or chief symptom precipitating medical referral of an elderly person by virtue of its shattering social effects. Often this main complaint comes from the patients' entourage rather than the patient himself. The latter may be deeply ashamed of, sadly resigned to, or apparently absolutely unaware of this main complaint. This calls for a special combination of tact and incisive observation at the outset. The approach is much simplified if the doctor adopts and even aggressively projects the common-sense precept that incontinence is an almost inevitable concomitant of any illness or immobilising injury in an elderly or disabled person, however exalted, to be faced cheerfully rather than as a dreary shameful manifestation of aging that needs to be concealed. Continence in such a contingency should be greeted with respectful surprise or even doubt demanding reconnaissance of the bedroom rather than incontinence to be observed with any emotion other than sympathetic concern. Finding his incontinence taken for granted in routine fashion, the patient, relieved of shame and self-reproach and finding denial or other ego-protecting defence unnecessary, may confide the gruesome details and co-operatively permit a thorough examination of himself, clothing, and household arrangements.

Thus, as well as a history of the predisposing illness or injury and resultant immobilisation or environmental disturbance, some information may be obtained from the patient as well as the attendants. A drug history is important because so many psychotropic drugs have an atropine action and predispose to urinary retention with overflow incontinence, as do sympathomimetic drugs given for bronchospasm and heart block, and,

of course, urinary retention with overflow incontinence may result specifically from routine continuous administration of anticholinergic drugs such as propantheline bromide and emepronium bromide given for urinary incontinence; and the effect of powerful diuretics must be taken into account.

In hospital the incontinence factor is historically best analysed by some sort of incontinence chart. Essentially, this entails the recording every two or four hours of whether the patient is wet or dry. The chart should allow space for the nurse to confirm by her initials that she has offered or taken the patient to the lavatory or provided toilet appliances on each of these occasions.

Examination will include reference to cognitive function and integrity of long tracts in the central nervous system; and in the urogenital system, bladder distension, enlarged prostate in the man and prolapse or vulval changes in the woman. The rectum will be checked for faecal overflow or impaction, and the urine will be examined for evidence of infection, as well as glucose and protein. Urine specific gravity may be a helpful indication of renal function in the presence of dehydration, a common feature in such cases.

Urological assessment may be needed in prostatism in men and suspected bladder neck troubles in women. Women with true stress incontinence associated with uterine prolapse and other disorders—such as urethral caruncle—will need gynaecological assessment.

Investigations of stubborn cases without an obvious local lesion may include intravenous pyelography, which apart from revelations about renal function will indicate the residual urine non-invasively, a micturating cystogram in cases with suspected bladder neck troubles, and cystometry. Cystometry enables simple recording of the intravesical pressure and sensations of the patient with given increments of fluid content. Thus the various types of neurogenic bladder may be diagnosed.

Autonomous bladder—Both afferent and efferent sides of parasympathetic innervation are destroyed by lesions affecting the cauda equina—for instance, trauma or a tumour. Vague sensation may remain through the sympathetic innervation but generally the autonomous bladder is devoid of effective sensation and empties incontinently and inefficiently from time to time as a result of local and axonal reflexes.

Atonic neurogenic bladder—The over-distensible bladder occurs typically in *tabes dorsalis* with destruction of the posterior nerve roots. Some power of voluntary micturition remains but the patient is so constantly unaware of bladder filling that the bladder tends to become overdistended, leading eventually to retention and overflow.

Reflex neurogenic bladder—The sacral bladder centre remains intact but both the afferent and efferent connections with higher centres are destroyed as with the typical paraplegic bladder that is devoid of sensation and empties incontinently from time to time. This bladder is associated with a degree of residual urine since emptying does not seem to be totally effective. The bladder is thus exposed to a constant series of uninhibited contractions, intravesical pressure is high for most of the time, and a secondary hypertrophy of the detrusor muscle results, which may be complicated by the formation of diverticula.

These three types of neurogenic bladder are not specifically age-related, but the fourth type underlies or seems to underlie much of the dysuria and incontinence presenting in the aged.

Uninhibited neurogenic bladder—Sensation is characteristically retained but the ability to inhibit spontaneous contractions is lost. This may result from a lesion in the frontal cortex and may occur in patients with stroke disease or with a frontal lobe tumour. Some degree of the uninhibited neurogenic bladder may occur in elderly patients due to age-related neuronal fall-out within the cerebral cortex. It is emphasised, however, that the phenomenon may not result from structural damage at all in many cases but may result from a functional disturbance—for instance, emotional breakdown with regression as described by Newman,⁵ or denial—so that cystometry may not immediately distinguish between organic and functional

mechanisms but may, if sympathetically carried out, provide an opportunity to probe and restore insight and stimulate recovery of normal function in such a patient—that is, provide an additional means of bladder retraining.

Treatment

Successful management of urinary incontinence in the elderly depends, as with other ills, on diagnosis and common sense as much as technical expertise. The first important general principle is to avoid palliative containment of apparent incontinence, which is remediable, because it tends to perpetuate the symptom. The increased availability of ingeniously designed diapers, for instance, contains the symptom, but impeding effective access to a suitable toilet receptacle is an important factor in increasing the frequency of habitual incontinence. Similarly, the ubiquity of disposable incontinence pads is a godsend to attendants and nurses of potentially incontinent elderly patients marooned or nearly marooned in beds, arm-chairs, or wheelchairs, but it promotes apathetic acceptance of the condition by both patients and their attendants: it is easier to supply a gross of pads than institute remedial action. Cot-sides on beds, geriatric chairs of the Offerton or Buxton type that have locking tables, sometimes described as the modern strait-jacket, and the sombrely named geriatric harness may prevent some falls in confused and tottery patients, but, by immobilising the patient, they tend to demand an incontinent habit unless patient-nurse communication is ideal and nurse-patient ratios are much higher than is likely in places where such expedients are adopted.

Treatment of symptomatic incontinence in hospital may respond to setting up the patient's domiciliary adaptation, however unconventional, unless it can be improved (a cardinal principle of a policy of preventive habilitation). Provision of a suitable emergency receptacle such as a bedside commode for patients who can just climb off the side of the bed, a plastic jug, St Peter's boat, or even a soft plastic pail for patients who can sit on the side of the bed without being able to leave it, or a horseshoe cushion for chairbound patients sitting in chairs or wheelchairs especially may suffice.

For patients who are immobilised in bed a urinal bottle, preferably of transparent plastic with cap, is suitable for men with two functional arms, or a female equivalent with wider swan neck for men with only one functional arm—such as the man with hemiparesis; many women can be taught how to use one of the various female urinals on the market, especially the flat dish type. Some patients cannot easily void when recumbent, and urinary retention with overflow incontinence may result from this alone or other causes.

Routine rectal examination will disclose or exclude faecal impaction, which must be dealt with, and prostatic enlargement in such men, though tender bladder distension sometimes makes this difficult to judge. Simple measures such as running taps, stimulating perineal skin, or a hot bath may suffice, or, in the absence of prostatic enlargement, small doses of carbachol or distigmine bromide will overcome retention, and normal bladder control may be restored. Failure of these simple means to correct urinary retention clearly demands catheterisation.

Even with emergency catheterisation in elderly patients, two other factors are as important as the paramount consideration to avoid introducing infection into the bladder: firstly, the choice of catheter to minimise trauma and serve what may be an extended need—the ideal catheter is an atraumatic plastic self-retaining "three-way" catheter that may be cleaned of blockage in situ—and, secondly, adequate psychological preparation to avoid inducing either the regressive or the denial mechanisms of incontinence referred to above. The procedure should be thoroughly explained to the patient so that he can accept and understand the sensations associated with both the introduction and the acceptance of a self-retaining catheter with intermittent or continuous drainage, without losing bladder

awareness. Otherwise it may be found that withdrawal of the catheter later is accompanied by further retention or at best an apparently uninhibited neurogenic bladder. Periods of intermittent drainage are a wise precaution to prevent loss of capacity due to chronic contraction of the bladder, a risk that is greatly increased by inadequately treated bladder infection.

The place of the catheter in managing greatly incapacitated immobile elderly patients depends on common-sense indications such as the need—for instance, in diabetics—for frequent urine testing; monitoring urine output in managing oliguric or oedematous patients, especially those on diuretics where the output may be enormous; the presence of pressure lesions the healing of which would be delayed by the presence of urine; patient acceptability; and the quality and quantity of nursing and patient-nurse communication available. The urine bag should be carefully sited for portability and camouflage to safeguard the dignity of the patient.

For immobilised men condom appliances or Paul's tubing, if they suffice, are to be preferred to the indwelling catheter. Where the internal sphincter has been damaged by prostatectomy, condom appliances may be effective or patients may tolerate a penile clamp.

Prolonged antibiotic treatment may be needed to eliminate persisting infection in residual urine in men with prostatism or women with minor degrees of uterine prolapse, either of which may be accompanied by chronic trigonitis with distressing frequency of micturition and incontinence.

In stubborn cases of nocturnal incontinence of urine associated with polyuria, drugs such as propantheline bromide or emeponium bromide may be given to increase bladder capacity at night. Taking these drugs throughout the 24 hours tends to promote residual urine with resulting overflow incontinence and increased susceptibility to reinfection and is therefore contraindicated. Moreover, when these drugs are given overnight, it may be desirable to reverse their effect in the morning with carbachol or distigmine bromide in the absence of urethral obstruction—for instance, due to prostatic enlargement.

Oestrogen treatment in women after the menopause is important in controlling urinary incontinence by restoring a

healthy urethral and perineal epithelium that resists reinfection, facilitates control of uterine prolapse with appliances if necessary, and generally eliminates soreness and distress in the orifice area, which will encourage denial of bladder awareness. Urological and gynaecological disease will clearly demand appropriate specialist treatment. Cases of minor uterine prolapse in women may respond to pelvic floor exercises.

If and when passive containment of unavoidable incontinence is necessary, absorbent pads should be designed with hydrophobic material to draw the urine through an upper permeable but non-wettable layer to protect the skin from urine. The non-permeable backing of pads and all plastic drawsheets should ideally be "bubbled" both to prevent pressure trauma and provide space for voided urine. Similarly, diapers should have absorbent material to take the urine away from the skin and allow removal of soaked material from the outside rather than the inside. Details of such pads and diapers may be obtained from the Disabled Living Foundation* or Willington's book.¹¹ Proper management of sick and injured elderly patients in the acute stage will, however, greatly reduce the need for those expensive and valuable supplies.

References

- ¹ Sheldon, J H, *The Social Medicine of Old Age*, London, Oxford University Press, 1948.
- ² Agate, J N, *The Practice of Geriatrics*, 2nd edn. London, Heinemann, 1970.
- ³ Brocklehurst, J C, *Incontinence in Old People*, Edinburgh, E and S Livingstone, 1951.
- ⁴ Willington, F L, *Gerontologia Clinica*, 1969, **11**, 330.
- ⁵ Newman, J L, *British Medical Journal*, 1962, **1**, 1824.
- ⁶ Sargent, W, *Battle for the Mind*, London, Heinemann, 1957.
- ⁷ Hamerger, B, and Norberg, K A, *International Journal of Neuropsychopharmacology*, 1965, **4**, 41.
- ⁸ McMichael, J, *Brain*, 1945, **68**, 162.
- ⁹ Isaacs, B, *Incontinence in the Elderly*, ed, F L Willington. London, Academic Press, 1976.
- ¹⁰ Levine, J, and Zigler, E, *Journal of Consulting and Clinical Psychology*, 1975, **43**, 751.
- ¹¹ Willington, F L, editor, *Incontinence in the Elderly*. London, Academic Press, 1976.

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What tests are used for discovering the intelligence quotient of school-children? Is there any evidence that the results of these tests differ in people of different races?

The most commonly used test for the individual measurement of children's intelligence is the Wechsler Intelligence Scale for Children, which was published in a revised form in 1974. The McCarthy Scale and the Stanford Binet Scale (sometimes referred to as the Terman-Merrill) are also used, although the latter has been criticised on statistical grounds and is becoming less popular. All these tests are American, but some standardisations for use in other countries exist. Group tests are often used in schools and for survey work. There is no one outstanding test of this type, and they are not recommended for arriving at an individual child's IQ. Children from different races and different social classes do obtain different test scores, but there is no general agreement on the relative part played by inherited characteristics, cultural factors affecting the child's actual performance, and cultural factors affecting the test content and administration.

Sattler, J M, *Assessment of Children's Intelligence*. London, W B Saunders, 1974.

Does rauwolfia cause breast cancer?

The matter is undecided. Three papers¹⁻³ in 1974 suggested an association between the taking of rauwolfia derivatives and the later development of breast cancer, and it was surmised that prolactin secretion, stimulated by the drugs, might have inhibited lymphocyte rejection mechanisms. Subsequently, three more papers⁴⁻⁶ failed to find a valid association between rauwolfia and cancer (the last paper

interestingly showing that hypertension was commoner in patients with breast cancer than in controls). Further evidence is awaited. Meanwhile caution is advisable, and it is wise to use other anti-hypertensive agents for new patients. For patients already established on, or well controlled by, reserpine there is insufficient proof to justify changing the drug for this reason alone.

- ¹ Boston Collaborative Drug Surveillance Programme, *Lancet*, 1974, **2**, 669.
- ² Armstrong, B, Stevens, N, and Doll, R, *Lancet*, 1974, **2**, 672.
- ³ Heinonen, O P, et al, *Lancet*, 1974, **2**, 675.
- ⁴ Mack, T M, et al, *New England Journal of Medicine*, 1975, **292**, 1366.
- ⁵ O'Fallon, W M, Labarthe, D R, and Kurland, L T, *Lancet*, 1975, **2**, 292.
- ⁶ Laska, E M, et al, *Lancet*, 1975, **2**, 296.

Some airline pilots on regular overseas trips may take antimalarial tablets continuously for periods of several years. Are there any risks to such prolonged prophylaxis?

Chloroquine in large doses causes visual impairment or blindness in a few people. People taking chloroquine 300 mg weekly for prophylaxis against malaria may take extra chloroquine if they develop a fever and thus increase the risk of visual impairment. Consequently, chloroquine is unwise for airline pilots. Proguanil 100-200 mg daily is safer. Maloprim (pyrimethamine 12.5 mg with dapsone 100 mg in each tablet), two tablets weekly, is effective chemoprophylaxis against malaria anywhere in the world. Airline pilots may develop malaria in Africa but are unlikely to do so elsewhere; thus, daily proguanil is the drug of choice. Alcohol increases the susceptibility to malaria and many other diseases, and airline pilots should not drink alcohol if they wish to maintain perfect physical health.