महानिदेशक सशस्त्र सेना चिकित्सा सेवा चिकित्सा ज्ञापन क्रमांक-143

DG AFMS MEDICAL MEMORANDUM NO.-143

अभिघातज अधरांगघात में मूत्राशय की देखभाल
CARE OF THE BLADDER IN TRAUMATIC PARAPLEGIA

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DGAFMS MEDICAL MEMORANDUM NO.-143

CARE OF THE BLADDER IN TRAUMATIC PARAPLEGIA

1. The urological disorders which occur as the result of injury to the spinal cord are numerous and of very great importance. They are one of the outstanding causes of ill-health and shortening of life expectancy. In any spinal cord injury, even those that are incomplete, it is almost inevitable that bladder function will be impaired. Prior to World War II, most spinal injury patients died within a few years of their injury, and usually from a renal cause. Since that time, due to improved care of the urinary tract, spinal injury patients live almost normal life spans and less than half die from renal pathology.

2. In normal physiology, when the bladder is filled (approx 400 ml.), sensory afferents in the sympathetic, parasympathetic and somatic divisions are stimulated and they transfer impulses to the micturitional reflex centre of the cord. The desire to void and sensation of fullness reaches the brain through the posterior columns, cerebral control provides an inhibitory influence to reflex micturition.

3. After the inhibitory effects of cortical control are released, motor impulses descend via the cortico spinal tracts and they travel via the parasympathetic fibres to the bladder and this results in increased detrusor tone shortening of the trigone with closure of the ureteric orifices, and opening of the internal urethral orifice. This is accompanied by voluntary relaxation of the perineum and contraction of the abdominal wall and diaphragm because of which the bladder empties. If desired, the stream can be voluntarily interrupted by contraction of the perineal muscles.

Neurogenic Bladder

4. Neurogenic Bladder is one whose function has been modified by some interference with its nerve supply. After a spinal cord injury, the affect on the bladder depends on the time interval after injury, the level of the cord injury and the degree of cord damage.

5. During the period of spinal shock, the areflexia flaccid paralysis below the level of the lesion involves the bladder function. The patient will develop acute retention with overflow in-continence and a catheter is required to relieve the retention.

6. In upper motor neuron (UMN) lesions above the centre of micturition (S2 S3 & S4), reflex activity returns as the phase of spinal shock passes. In a lesion above the conus, the spinal micturitional reflex is intact and an 'automatic type' of bladder results. The bladder will empty involuntarily as it fills with urine. The capacity may be less than normal, but there is good voiding pressure at capacity. There is no sensation of bladder fulluess.

7. In lower motor neuron (LMN) lesions involving the micturition centre (S2, S3 & S4 Segments) of nerves of cauda equina the spinal micturitional reflex is interrupted and an 'autonomous bladder' results. Bladder function is governed by a miogenic stretch reflex inherent in the detrusor fibres themselves. This type of dys-function is characterised by a linear increase in intravesical pressure with filling, until capacity is reached. Urine then may flow past the sphincter by overflow incontinence.

8. In mixed UMN—LMN lesions, such as with a conus-cauda equina inujry, it is possible to have a flaccid LMN detrusor, yet a spastic sphincter. The reverser may also occur. Other patterns of mixed neurogenic bladder may occur with incomplete cord lesions where there is partial voluntary control over-riding reflex function due to which precipitate urination results. This is common in central cord syndromes and Brown sequard syndromes.

Initial Bladder Management

9. Main aims of management are :—

(a) Prevention of acute retention of urine

(b) Prevention of distension of bladder wall

(c) Prevention of urinary tract infection

(d) Maintain muscle tone and bladder function.

Acute Management

10. (a) On admission—In the acute stage, the patient is restricted from oral intake i.e. kept nil orally.

(b) IV therapy during this period maintains the fluid balance.

(c) An indwelling catheter (IDC) is inserted, such as Gibbon's catheter, to prevent over distention of the bladder thus preventing irreversible detrusor stretch

(d) The IDC remains in situ until 24 hours after the IV infusion is discontinued to allow for delayed diuresis.

(e) The patient is commenced on 125 ml 2 hourly fluid restriction 2 hours prior to removal of indwelling catheter.

(f) 6 hourly intermittent catheterisation is commenced at this time continuing with restricted fluid intake of 125 ml every 2 hourly/24. This intake is gradually increased to 150 ml, 175 ml and then free fluids at the discretion of the medical officer.[1]

(g) If the volume of urine obtained is greater than 500 ml but less than 600 ml the fluid intake is reduced to 100 ml, 2 hourly for 24 hours until smaller volumes are voided and then the intake can be increased. If the volume of urine obtained is 600 ml or more, the fluid intake and the frequency of catheterisation is altered i.e. restricted intake of fluids to 100 ml and intermittent catheterisation 4 hourly for 24 hours.

(h) Maintenance of accurate fluid balance is essential to keep a close check on the bladder function.

(j) Catheterisation is carried out under strict aseptic technique and a dipslide specimen taken at each catheterisation.

11. The duration of the initial stages of bladder paralysis varies from 8 days to 6-8 weeks. The duration of this stage depends on various factors like :

(a) Hypotonicity of the bladder wall due to chronic over distension.

(b) Delayed development of reflex automatism of the isolated cord as a result of degree of longitudinal damage to the cord besides transverse lesion.

(c) Age of the patient.

(d) Efficiency of the initial management of the bladder.

12. The choice has to be made between the institution of intermittent catheterisation or the insertion of an indwelling catheter. Intermittent catheterization is more preferable form of treatment. However the institution of Intermittent Catheterisation needs availability of adequate staff. The

preference of intermittent catheterisation have been summed up by Guttmann and Frankel as below :—

(a) Early use of indwelling catheter inevitably leads to bladder infection within a few days.

(b) It is important to allow the urethral and bladder mucosa to become accustomed to the presence of a foreign body gradually.

(c) Intermittent catheterization allows some distension of the bladder which supplies a stimulus for micturition. They found that automatic reflex micturition became established in young patients in 8—14 days, whereas by other methods the recognized period for this is 5—8 weeks

13. Continuous indwelling catheterization can best be done by using a Gibbon's polythene catheter drainage. The advantages of this catheter are :—

(a) Uretheritis is minimised or eliminated partly by the nature of the material which is chemically and physically non-irritant and partly by the small calibre of the tube. The urethral sores and fistulae are completely eliminated

(b) Drainage continues for many weeks usually without any attention.

(c) The tubing is so light that there is little tendency for displacement during patient's frequent change in position.

Clean self Intermittent Catheterisation

14. After successful initial management of bladder paralysis patient should be taught clean self intermittent catheterisation, a procedure which was first started by Rapides. This is a useful procedure which is aimed at increasing intravesical pressure or decreasing outlet resistance. It is also helpful in conditions of inadequate urine storages stress incontinence or in case of inadequate bladder emptying.

(a) This procedure calls for good patient motivation and co-operation from the patients and their relatives.

(b) *Procedure*—A suitable size Gibbons catheter or Foleys catheter (12—14F) or a feeding tube (children) can be used. No sterilisation is required. Both the hands are washed and a well lubricated catheter is passed by the patient or his attendant at such intervals that the

volume of urine does not exceed 300-350 ml each time. The catheter is removed, washed in soap and water dried and kept in an envelop ready for use next time. Catheter is changed once a month. Patients are trained to carry out the procedure by themselves and females encouraged to practice before a mirror.

(c) Asymptomatic bacteruria does not need any treatment, however 5 ml of 1 % povidone iodine may be instilled and left in the bladder, twice a day in case of high bacteriological positivity.

(d) Long term safety and efficacy of this regimen is well established and patient has a catheter free life with avoidance of attendant complications.

Bladder Training

15. After the period of spinal shock, and before bladder training is intensified, a bladder profile is obtained through several tests.

16. The bulbocavernosus reflex and anal reflex are tests of perineal somatic nerve supply. The former is elicited by rapidly squeezing the glans, or tapping the clitoris, with the examining finger in the anus. The normal response is contraction of the anal sphincter. The anal reflex consists of the contraction of the anus following a scratch of the peri-anal skin (Pudendal nerve).

17. The autonomic supply of the deterusor can be checked by the ice water test. 50 ml of sterile water is instilled into the bladder through a straight 14F size catheter. If the reflex is intact, the water and catheter will be expelled immediately or within 60 seconds (pelvic splanchnic nerve). All these reflexes return early in the UMN lesions. After spinal shock, their absence indicates a LMN lesions.

Upper Motor Neuron Bladder

18. In the UMN bladder on catheter drainage, detrusor training can be intensified with two hourly clip-off through the day, and straight drainage through the night. During this time the patient learns the relationship between fluid intake and urinary output. He learns to substitute a time clock for the lost feeling of the desire to void.

19. With the catheter removed, the UMN bladder must be stimulated to initiate the reflex detrusor contraction and to empty efficiently. The reflex contractions occurring spontaneously from the filling of the bladder usually do not empty the bladder completely. The spinal patient finds 'trigger point' to augment the voiding contraction by tapping over the trigger point. The patient thus learns to empty his bladder at least every 4 hours for the rest of his life. If he forgets and lets the bladder partly empty itself reflexly, the bladder tends to over-distend. The residual urine predisposes to infection.

20. Drugs can be used to supplement detrusor training. Those that facilitate parasympathetic function may be used to improve a reflex contraction. Carbach-1 is the best of this group. To decrease the detrusor spasticity, probanthine is of help in controlling the autonomic hyper reflexia.

Lower Motor Neuron Bladder

21. In the LMN bladder on catheter drainage, detrusor training is usually begun with two hourly clip-off to maintain bladder capacity and detrusor-tone.

22. Although the LMN bladder is denervated, the detrusor has some inherent contractile ability. If the bladder is prevented from chronically distending, for long periods of time, this contractile force can be utilised in bladder emptying.

23. With the catheter removed, this type of bladder can only be emptied by external pressure. This is done by increasing intraabdominal pressure by strainiy if the abdominal musculature is intact, or by 'Crede manoeuvre' where direct pressure is applied to the bladder by manual suprapubic pressure.

24. Drugs like carbachol and probanthine have little use in LMN bladder training, as the bladder is denervated.

Residual Urine

25. It is the amount of urine left in the bladder after the patient has voided all the urine that he or she has. It is necessary to train the forces of expulsion to overcome the resistance of the bladder neck outlet. Once voiding is possible, then a balance between expelling forces and outlet resistance must be achieved so that the bladder is able to empty, or very nearly so.

26. In bladder training, resiual urine determination is a useful test of bladder function and time is spent in training bladder to reduce the level of residual urine :

27. High residual urine predisposes to reflex, back pressure on the kidneys, as well as persistant urinary infection and stone formation.

Bladder Gradings

From Nil—80 ml residual urine	Grade-1	Bladder function is satisfactory.
From 80—150ml ,,	Grade-2	Fair bladder function but should be watched.
From 150ml and above ,,	Grade-3	Poor bladder function and may require surgery or drugs.

Laboratory Results

28. Urine is collected under aseptic conditions and is sent to the laboratory for culture at each catheterisation :—

(a) If less 10^4 Bacteria per ml—not infected.

(b) If between 10^4-10^5, ambiguous—could have been contaminated at the time of the collection.

(c) If more than 10^5 infection is indicated and treatment should be commenced after antibiotic sensitivity test.

Final Condition

29. If the patient has developed a well controlled reflex type of bladder or one that can readily be emptied by voluntary straining or suprapubic pressure, he may not have to wear a urinal bag during the day. If he is careful to stimulate the bladder regularly every few hours, he may avoid accidental enuresis and keep him selfdry. Otherwise, the males must wear a urinal constantly whilst out of bed. Female patients wear waterproof pants with towelling pads.

30. There are several types of urinals which are quite widely used. In all cases there has to be a bag, plastic or rubber, strapped to the thigh or leg as a reservoir. The part of the apparatus which is more variable is the fitting for the penis which is connected to the bag. The neatest, lightest and least traumatic is undoubtedly the condom type which is applied with a special adhesive. At night, patients do not usually wear such apparatus. A metal or plastic urinal is placed and held in position with a small sand bag. Some patients do wear a condom at night.

31. In patients with UMN lesions, 'Tapping' is carried out to encourage emptying of the bladder by mechanical means. It also helps to reduce the residual urine to an acceptable level.

32. For tapping the bladder, a patient should allow himself 6—10 minutes. A good guide line of how to tap is 20 taps, rest 20 taps, rest, at the rest time trying to stroke the lower abdominal area. This will encourage voiding. This can be done 4—5 times to result in voiding. The action of tapping should be firm but not hard. The hand is held approx 9" above the bladder and let the hand fall, that is about the pressure required.

33. Adequate follow-up of urinary function is to be done with the following procedures :—

(a) 24 hours urine collection and regular routine examination of the urine and culture.

(b) Intravenous pyelography when indicated, to know the kidney function.

(c) Cystogram, Cystourethrograms to know the bladder condition and its outflow.

(d) To confirm the type of bladder which has resulted from individual cord injury, it is usual to carry out cystometrography.

(e) Ultra sonography.

34. Besides the above, other regular examinations are made of haemoglobim, blood electrolytes when indicated, blood urea and creatinine

35. If there is evidence of appreciable residual urine, obstruction of bladder neck or beyond must be excluded. The obstruction may be due to spasm or fibrous contracture. Following methods of treatment are available to relieve the residual urine :—

(a) Subrachnoid alcohol block when there is a complete cordlession associated with marked spasticity of sketletal muscles.

(b) Re-section of bladder neck, if the residual urine is high and the bladder is satisfactory otherwise, but associated with a shelf or ledger demonstrated at the posterior aspect of bladder neck on cystourethrogram, or cystoscopy.

(c) Pudendal neurectomy when there is obstruction usually caused by spastic external sphincter. This relieves the outlet obstruction.

(d) Spasm of external sphincter is relieved also by external sphincterotomy performed transurethrally.

36. Finally, to maintain a good bladder function, the following points should be kept in mind :—

(a) Recognition of early symptoms of urinary tract infection or bladder mal-function as evidenced by :—

(i) Twitching or tightening of abdominal muscles
(ii) Increased spasm of lower limbs
(iii) Flushing of the face
(iv) Vage feeling of fullness.

(b) Fluid intake—at least 3 litres of fluid per day to give a flushing effect.

(c) Only 500 ml of milk should be taken per day to avoid renal calculi formation.

(d) No alcohol—as it is a diuretic and causes the bladder to fill quickly and therefore over-stretching may occur. Also dehydration is possible if large amounts of alcohol are consumed. Alcohol may react with the medications the patient is taking, causing side effects.

(e) Bladder evacuation should be done 2 hourly/24 until bladder function is satisfactory and then may be extended to 3 hourly/24 and some times 4 hourly/24.

(f) Adequate teaching and encouragement.

(g) Drug therapy may play an important role in good bladder function and patients must be aware of the actions of these drugs and the importance of taking them as prescribed.

(h) Surgery may be required to gain good function such as :

(i) Sphincterotomy
(ii) Bladder neck resection.

(j) Adequate follow-up of urinary function as out patients :—

(i) Cystogram
(ii) IVP
(iii) 24 hour urine collection and for routine culture examinations.

(P. K. CHAKRABARTI)
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