A CLINICAL SURVEY OF CORD BLADDER

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A great deal has been written regarding the anatomy, physiology and pathology of the urinary bladder and the clinical management of its pathological conditions. Many points are still in dispute, undoubtedly because there is so much still to be learned. In this paper I shall try to present a few facts learned from the literature, which are most generally acceptedand of interest in so far as they pertain to the condition known as "coord bladder".

The term "coord bladder" was originally applied to a bladder condition, which was actually a paralysis of the bladder, developing secondarily to lesions found only in the spinal cord. It has now grown to include conditions where the bladder fails to function because of lesions in the nervous system, whether these lesions be central or peripheral. Hence a better term might be simply bladder paralysis.

For a better understanding of bladder paralysis a brief summary of bladder innervation seems in order. It is supplied by three sets of nerves, as follows:

1. The sympathetic nerves, also known as the hypogastric or presacral nerves.
2. The parasympathetic nerves, also known as the pelvic nerves.
3. Somatic or pudic nerves.

The sympathetic pathway is believed by many to be connected to the spinal cord, between the second dorsal and the third lumbar spinal segments, inclusive. This pathway contains fibers which are (1) inhibitory to the

expulsive muscles of the bladder, (2) motor to the muscles around the ureterovesical orifice, (3) motor to the muscle in the trigone, (4) motor to the internal sphincter, (5) motor to the smooth muscle of the prostate gland, (6) motor to the smooth muscle of the seminal vesicles and ejaculatory ducts, (7) sensory conveying impressions of distention of the bladder, (8) sensory carrying impressions of pain, (9) vasoconstrictor to the vessels of the bladder. The branches going to the hypogastric ganglia from the second and third sacral sympathetic ganglia probably contain some sensory fibers of type (8).

The parasympathetic nerves probably connect chiefly with the second and third sacral segments. They contain fibers which are (1) motor to the expulsive muscles of the bladder, (2) inhibitory to the internal sphincter, (3) sensory for the micturition reflex, and (4) sensory for tactile and painful impulses from the bladder and in part from the posterior urethra.

The somatic or pudic nerve arises from the third and fourth sacral segments. It is believed to supply some sensory fibers to the posterior urethra. It, however, is motor to the external sphincter.

There is really little known about bladder physiology and it is probably this fact that accounts for our inability to understand more clearly bladder paralysis. However, it is known that while the bladder is filling its walls are relaxed and its sphincter is tight; both of these being involuntary acts. The sympathetic nerves are often called the "filling nerves" because they are inhibitory to the expulsive muscle of the bladder and motor to the internal sphincter. On the other hand, the parasympathetic nerves are considered the "emptying nerves" because they are

motor to the expulsive muscles of the bladder and inhibitory to the internal sphincter. While the bladder empties its walls contract and its sphincter relaxes. Thus for a normally functioning bladder there must be a delicate counter-balance between these two systems, sympathetic and parasympathetic.

The somatic nerve has to do with the voluntary part of micturition in that it supplies the external sphincter. To postpone micturition this voluntary sphincter may contract but it then, in all probability, bears the burden of pressure alone against the continued sensory stimuli to the cord portion of the emptying mechanism. Crevey believes that the brain probably has two centers, at least one, in the frontal lobe which has to do with the act of micturition. The motor fibers from these areas to the bladder are probably in or about the pyramidal tract and the sensory fibers in the posterior columns. Increased pressure in the bladder stimulates the expulsive mechanism and the desire to void is thus produced in the cerebral cortical center. The external sphincter relaxes, the trigone muscle pulls open the internal sphincter and urine escapes. He feels that to produce complete loss of sensation, the lesion must be bilaterally symmetrical. Other writers agree that there are higher centers of micturition, but they place them farther back in the braine

Etiologically cord bladder, or bladder paralysis, can be divided into two large groups. The following list is not meant to be all inclusive by any means but merely gives those conditions most frequently met.

1. Congenital
    a. Spina bifida

2. Acquired
    a. Neoplasms of the brain and spinal cord

b. Injuries
c. Syphilis. (Of the syphilitic lesions cord bladder is most frequently associated with tabes dorsalis.
d. Miscellaneous causes, syringomyelia, multiple sclerosis, myelitis, hemiplegia and pernicious anemia, hematomyelia.

Undoubtedly many cases of hematomyelia are traumatic in origin and thus might be placed under that grouping.

Cord bladder occurs predominantly in males, between the ages of 25 and 55. Roughly about 50% of the cases enter the hospital because of urinary symptoms, which are incontinence, retention, difficulty in starting the urinary stream, dysuria and pyuria. Another large group enter the hospital for treatment of neurological conditions of which a cord bladder is a secondary manifestation. It has been estimated that in about eighty per cent of the cases of tabes the urinary symptoms appear quite early in the course of the disease, while in pernicious anemia urinary symptoms may be present early they appear late usually.

The diagnosis of cord bladder depends upon the history and symptoms as given by the patient and then on a careful analysis of the objective findings. In obtaining the latter an important procedure is a cystoscopic examination. The vesical sphincter may be very spastic or have its tone diminished to absent. Residual urine is usually present in varying amounts. Due to impairment of sensation the cystoscope can usually be manipulated without much discomfort. The bladder wall is smooth and pale and shows small thin trabeculations. The latter is in contrast to the hypertrophy in case of obstruction. Confusion in diagnosis may frequently arise where there are complications, such as an urethral stricture or prostatic hyper-

trophy. There is also a change noted in intravesical pressure. In the spastic cases the pressure is increased, while in cases with flaccid paralysis it is lower than normal. Recognizing this change in intravesical pressure, Rose in 1927 devised an apparatus called cystometer for the purpose of obtaining data regarding the integrity of the mechanism of the bladder. This apparatus records simultaneously, while the bladder is gradually being filled with water the capacity, changes in pressure and the subject's sensations - his first desire to void, mild and severe pain of overdistention. There are a number of sources of error with this procedure greatest of which is that the patient is frequently unable to accurately cooperate. Therefore, the cystometrogram is regarded as not being diagnostic but presenting corroborative evidence in the support of a diagnosis.

Another diagnostic aid is the cystogram which is a typical case of flaccid paralysis of the bladder shows a large bladder, smooth or only slightly irregular in outline and having a typical conical shape.

In the clinical management of cases of bladder paralysis, treatment must be directed at two points, first, where possible the underlying cause of the cord bladder and second the cord bladder itself. I shall only discuss the latter.

The aim in treating a paralyzed bladder is to keep urinary tract infection down to a minimum. There certainly is no unanimity of opinion as to how this should be done. Many writers advocate complete avoidance of instrumentation in the cases of acute bladder paralysis or those cases which have no evidence of infection. This is to permit the development of paradoxical incontinence or automatic bladder. When this stage is reached, and

it takes several weeks to several months, the bladder fills and then empties itself. Cummings suggests the following aids in incontinence which then aids the development of an automatic bladder, namely prostatic massage, bladder massage per rectum, prolonged actual suprapubic pressure and hot enemata. When these procedures have become exhausted and retention still persists he suggests the use of caudal anesthesia with novocaine. This procedure relaxes the vesical sphincter and allows immediate emptying. Having once established an automatic bladder the patient must learn to empty his bladder on schedule. This, Cummings says, becomes as easy as that of bowel elimination.

Many writers state that an automatic bladder will not empty itself completely and that with a residual urine present, the bladder becomes infected regardless of instrumentation or not. Thus they feel that one of the basic principles in treating any infection should be instituted early and that is adequate drainage. Some feel that this is fulfilled by the indwelling urethral catheter and bladder lavage. Others feel this inadequate and thus favor suprapubic cystostomy. Boyd favors the latter and he gives as indications for its use - (1) Cases with sudden paralysis resulting from an acute infection in or about the spinal cord and from traumatic injury to the spine, (2) Cases of paralysis of the bladder due to nerve injuries from cord tumors, tabes dorsalis, spina bifida, etc. (3) Cases with injury of bladder sphincter caused by obstruction which are not sufficient to cause permanent and complete incontinence.

It is generally accepted that no matter how carefully catheterization is carried out, infection is bound to be introduced into the bladder.

This is particularly true of a paralyzed bladder. It is a fact that nearly all cases of acute urinary retention from any cause whatsoever have been catheterized before the urologist sees them, hence most cases have to be treated with infection already present. Boyd feels that not enough cases are reported without infection and treated without catheterization to draw any worthwhile conclusions about this method of treatment.

Another type of treatment is that intended to help the bladder utilize what expulsive power it may still possess. It is for this purpose that a presacral neurectomy is occasionally done. This procedure is carried out only in selected cases where the paresis of the bladder is due to parasympathetic injury which has thus upset the delicate counter-balance between sympathetic and parasympathetic systems. By the resection of the presacral nerve it is hoped to reestablish this counter-balance and the procedure has been successful in a number of cases.

Drugs which may be of some aid in helping the bladder to utilize its expulsive power are genergen (ergotamine tartrate) and "Mecholyl". The latter is given in doses of 300 to 600 mgm. per day. Its action is that of a parasympathetic stimulation and, therefore, is considered the best of the two to use in cases where the underlying cause of the bladder paralysis is multiple sclerosis. Genergen is given in doses of 4 mgm. a day and is best used in cases where the underlying cause of the cord bladder is tabes or central nervous system syphilis. These drugs by no means offer aid in every case.

The prognosis in bladder paralysis is variable and largely depends upon the pathology of the primary condition. With good care one should be

able to keep the urinary tract infection and damage down to a minimum and thus the patients deaths should not result from urinary tract pathology.

The following brief histories of cases of cord bladder were taken from the records of the State of Wisconsin General Hospital.

CASE I

A white male, age 61 years, admitted to the hospital on 12-15-33, complaining of dizzy spells. At the time of admission the patient had no symptoms referable to his genito-urinary tract. However, shortly after admission he began to complaint of retention and urinary frequency. He was catheterized and was found to have residual of 1400 cc. of urine. Diagnosis was tabes dorsalis with cord bladder. Because of the persistent urinary infection, a suprapubic cystostomy was done. The patient made an uneventful recovery from this procedure and had no further urinary complaints. He was discharged from the hospital on 2-24-34.

CASE 2

A white male, age 38 years, admitted to hospital on 8-29-32, with chief complaint of dim vision. He also complained of occasional urinary retention. Diagnosis was made of central nervous system lues. Treatment was directed toward the lues. He was discharged from the hospital on 10-5-32. The patient was readmitted on 4-3-33. He complained of urinary frequency and difficulty in starting the urinary stream. Diagnosis of meningo vascular involvement, tabes, and cord bladder with retention, was made. Treatment: Because of an apparent large urinary residual the patient's bladder was compressed over a period of days. Following compression a urethral retention catheter was inserted and he was given daily

bladder lavages. The patient was then voluntarily committed to Mendota State Hospital on 4-13-33, for continuation of anti-luetic therapy.

CASE 3:

White male, age 52 years, admitted to the hospital on 5-11-29 On 4-1-29 patient had a suprapubic cystostomy performed, at Richland Center Hospital because of complete urinary retention. Ratient's chief complaint however was abdominal pain. Urinalysis was negative. Diagnosis was tabes dorsalis with cord bladder. Treatment was directed toward specific infection. Before patient's discharge, there was very little urinary drainage through the cystostomy wound. Most of the urine was passing normally. The cystostomy wound was, therefore, allowed to close. Patient was discharged from hospital on 6-19-29, much improved. He was readmitted on 10-19-32, with a chief complaint of bladder trouble. He was unable to completely empty his bladder, had difficulty in starting the stream, continual dribbling, incontinence and hematuria were present. Urinary residual was 550 ccs. Cystoscopic examination showed grade II granulation from wearing catheter, internal sphincter was atrophic and nonfunctioning. Patient's nonprotein nitrogen was 111 mgs. per cent. Diagnosis was tabes dorsalis with cord bladder, severe chronic uremia, bilateral hydronephrosis. Treatment consisted of bladder decompression over a period of several days. An indwelling uretheral catheter was used with daily bladder lavage. Routine antiluetic therapy was instituted. Patient was discharged from hospital on 11-8-32, condition much improved.

CASE 4:

White male, age 48 years, entered hospital on 8-30-32. Chief complaint was loss of weight. He also complained of difficulty in starting

the urinary stream. He had a marked dysuria and incontinence during the night. Urinalysis was essentially negative. Diagnosis was tabes dorsalis with early cord bladder. The patient was catheterized and found to have 750 ccs. residual urine. An indwelling catheter was put in place and bladder lavages begun. Indwelling catheter was removed in five days. Following this patient was able to void and completely empty his bladder. Because of patient's poor general condition, no antiluetic therapy was advised. Patient was discharged on 9-12-32. He was readmitted on 7-3-33, complaining of severe pains in his legs. His bladder condition was the same as it had been on his previous admission. A cordotomy was advised but patient would not consent to this procedure. He was, therefore, discharged on 7-9-33. He was readmitted on 8-3-33 complaining of pains in his legs and stated that his bladder condition was much worse. He now complained of being unable to completely empty his bladder and also of a continued incontinence. Diagnosis was as before, and cystitis. Patient had 1100 ccs. residual urine, which was very trubid. Treatment consisted of indwelling urethral catheter and daily bladder lavage. A cordotomy was performed for relief of pain in legs. Patient was discharged on 9-9-33, with advice to see his local physician for intermittent catheterization. If this did not work a suprapubic cystostomy would be carried out. Patient was readmitted on 2-13-34. A simple suprapubic cystostomy was advised but refused by the patient. He was, therefore, discharged on 2-16-34, unimproved.

CASE 5:

White male, age 66 years, entered the hospital on 12-19-33 complaining of weakness. Patient also complained of a nocturia and urgency. He stated that he was never able to empty his bladder completely and that at times there was a continual dribbling of urine. Residual urine 350 ccs.,

which was quite infected. Cystoscopic examination revealed a loss of tone and some loss of sensation in bladder wall, also a decreased sensation and relaxation in prostatic urethra, rather marked prostatic obstruction, lateral lobes meeting in midline. Diagnosis: Tabes dorsalis, cord bladder, benign prostatic hypertrophy grade II. Treatment consisted of a suprapubic cystostomy. Shortly before this procedure was carried out patient developed a septic type of temperature and it was believed he had an upper urinary tract infection in addition to his cystitis. However, shortly after the cystostomy was done patient's temperature returned to normal and his general condition improved a great deal. He was discharged from hospital on 1-28-34.

CASE 6:

White male, age 50 years, entered hospital on 5-7-35 complaining that he could not hold his water. He had had this trouble for three years. Incontinence was that of overflow. He had a 500 ccs. residual urine, which showed many white blood cells and was positive to benzidine. Kidney function test showed marked impairment. Diagnosis was syphilitic meningomyelitis, cord bladder, prostatitis and cystitis. An indwelling catheter was put in place and bladder irrigations begun. The patient soon developed a severe epididymitis and when this had subsided a suprapubic cystostomy was done. He made an uneventful recovery , his general condition was greatly improved and he was discharged from the hospital on 8-5-35.

CASE 7:

White male, age 59 years, entered hospital on 7-15-35, complaining that he could not hold his water. He also complained of marked frequency and had noted pyuria for the past two months. He stated that he had urinary incontinence which was particularly annoying at night. On admission

patient's residual urine was over 400 ccs. and he was therefore decompressed slowly. Patient stated that at times he had catheterized himself morning and night. Cystoscopic examination showed a mild median bar, trabeculation grade II, spasm of the internal sphincter. The pain sensation was impaired. Cystogram showed a bladder about normal capacity, markedly irregular in outline, with one small diverticulum at the apex. Prostatic urethra contained the medium. There was complete reflux on both sides showing grade II dilatation in the pelvis and calyces on both sides and grade IV dilatation in both ureters throughout. Diagnosis: Meningo vascular lues, cord bladder, bilateral hydroureters. Treatment consisted of suprapubic cystostomy. Patient was discharged on 11-7-35. His suprapubic tube was draining well and his general condition was improved. The patient was readmitted on 11-30-35. Patient complained that he was very weak and stated that he had not been taking care of the suprapubic cystostomy tube. The tube was not functioning well and the urine showed gross pus. Diagnosis was as before with addition of pyelonephrosis. Patient expired on 12-6-35, of what seemed to be uremic coma.

CASE 8:

White male, age 39 years, entered the hospital complaining of being unable to pass his water. For the past several weeks he had catheterized himself whenever he felt this procedure necessary. He also had difficulty in controlling his bowels. Cystoscopic examination revealed trabeculation II, no obstruction, relaxation of the internal sphincter and spasm of the external sphincter. Urinalysis was normal except for the presence of many red blood cells. Diagnosis: syphilitic myelitis with spastic paralysis of the bladder. Treatment consisted of daily catheterization for residual

urine followed by bladder irrigations. The residual urine varied from 500 to 25 ccs. Routein antiluetic therapy was started. The patient was discharged on 1-24-34 with instructions to continue his antiluetic treatment. He was also shown how to catheterize himself and irrigate his bladder. The latter was to be done daily. The patient was readmitted on 2-13-35. He stated that since his discharge from the hospital he had felt very well. The bladder difficulty had disappeared entirely. He now had complete bladder control and no longer needed to use a catheter. Urinalysis was within normal limits.

CASE 9:

White male, age 38 years, admitted to hospital on 12-19-31, with a chief complaint of weakness. Patient also complained of nocturia, occasional attacks of retention and incontinence. Urinalysis showed many white blood cells. Diagnosis: Pernicious anemia with postero-lateral degeneration of the cord and cord bladder with mild cystitis. Treatment of the genito-urinary condition consisted of indwelling uretheral catheter with daily bladder lavage. Pernicious anemia was treated with Lilly's liver extract. In spite of therapy there was practically no change in patient's neurological condition. He was dischaged from hospital on 3-24-32.

CASE 10:

White male, age 62 years, admitted to hospital on 9-5-34, with a chief complaint of numbness in legs and feet. Patient also complained of a nocturia, difficulty in starting the urinary stream and urgency. Cystoscopic examination showed 92 ccs. residual urine, relaxed sphincters, trabeculation of bladder wall with acute cystitis, also a slightly enlarged prostate. Diagnosis: Pernicious anemia with combined sclerosis, cord blad-

der with cystitis, benign prostatic hypertrophy. The genito-urinary condition was treated with suprapubic cystostomy. The patient's general condition improved somewhat except the neurological signs which remained about the same as they were on admission. Patient was discharged on 12-10-34.

CASE 11:

Whitemale, age 41 years, entered hospital on 8-2-28 complaining of paralysis of the spine and legs. Patient has a urinary incontinence and much dysuria. There were many large ulcerating areas discharging pus on the penis and in the inguinal region. Diagnosis: Pernicious anemia with postero-lateral sclerosis, cord bladder, cystitis. Before any adequate treatment of the genito-urinary condition could be started patient became unconscious and died in uremia on 8-16-28.

CASE 12:

White female, age 55 years, admitted to hospital on 9-22-33. On this admission patient had no symptoms referable to her genito-urinary tract. Diagnosis was pernicious anemia with early cord changes. Response to liver therapy was satisfactory and patient was discharged on 11-2-33. She was readmitted on 3-14-35 complaining of pain across the lower abdomen. She also complained of difficulty in urinating and a great deal of dysuria and swelling about the external genitalia. Diagnosis was pernicious anemia with cord changes, cord bladder, cystitis, pyelitis. Treatment was all directed toward the pernicious anemia. Apparently nothing was done about the cystitis and pyelitis. At time of her discharge on 5-6-35 she was very much improved in every way.

CASE 13:

White male, age 53 years, entered the hospital on 8-27-32. Chief

complaint was trouble in walking. Patient also complained of a nocturia and trouble in starting the urinary stream. He stated that at times his urine had a very strong odor and was very dark in color. Diagnosis: Pernivious anemia with postero-lateral cord changes, cord bladder. While in the hospital the patient became very uncomfortable because of urinary retention. An indwelling catheter was, therefore, sinerted and continually kept in place. The bladder was irrigated daily. Pernicious anemia was treated with liver extract and dilute hydrochloric acid. At the time of discharge on 10-14-32 his general condition was somewhat improved but it was still necessary for him to wear an indwelling catheter. Patient was seen in the Outpatient Department on 10-8-34. He stated that he felt quite well at this time. His only genito-urinary complaint was that of urgency and nocturia. Urinalysis was negative. Patient was advised regarding further liver therapy.

CASE 14:

White male, age 52 years, entered the hospital on 1-8-34 with a chief complaint of inability to urinate. For months prior to admission the patient had complete urinary retention and had been catheterizing himself three times a day. Patient's general condition was very poor. Diagnosis: Pernicious anemia with postero-lateral sclerosis, cord bladder, cystitis. The treatment of the cord bladder consisted of a suprapubic cystostomy. Patient's general condition became progressively worse and he finally expired on 2-14-34.

CASE 15:

White male, age 70 years, entered the hospital on 4-25-32 Four weeks prior he had had a paralytic stroke and since that time had been un-

able to void. Three days after the onset an indwelling catheter was put in place and patient has worn this since that time. A cystoscopic examination revealed an acute cystitis with edema. There was moderate trabeculation with pus and blood in crypts. The internal and external sphincters were relaxed and markedly redundant. Granulation tissue was seen. Urinalysis showed much blood and pus. Diagnosis: Left hemiplegia from cerebral accident, cord bladder with cystitis, hypertensive heart disease. Treatment consisted of indwelling catheter, daily bladder lavage and urotropin 1/10 of a gram three times a day. The record does not state whether or not the patient improved. He was discharged on 5-16-32 with instructions to have daily bladder lavage and to continue the indwelling catheter.

CASE 16:

White male, admitted to hospital on 11-20-29 with a chief complaint of urinary frequency, uregency, hesitancy and dribbling. There were times when he had complete retention and at these times he would catheterize himself. Cystoscopic examination reported the posterior urethra and vesical neck seemed very spastic; 120 ccs. residual urine was obtained. The bladder showed an acute diffuse cystitis, grade I, trabeculation grade II, right ureter only was catheterized. An ureteral specimen showed a great deal of pus. Right pyeloureterogram showed dilatation of pelvis grade II. Diagnosis was spastic paraplegia, familial type, cord bladder with cystitis, bilateral pyelonephritis and dilatation of right renal pelvis. Treatment consisted of catheterization for residual ruine and bladder lavage Residual urine varied from 250 to 40 ccs. Patient was discharged on 12-7-29. His general condition was about the same as it was on admission. He was advised to continue this conservative treatment of his genito-urinary condition

until such time as a suprapubic cystostomy became necessary.

CASE 17:

White female, age 31 years, admitted to the hospital on 7-10-36, complaining of inability to empty bladder. Patient stated that at times she would have complete urinary retention and it was necessary for her to go to her doctor to be catheterized. She also complained of urgency, dysuria and marked frequency. While in the hospital patient's residual urine varied from 0 to 500 ccs. Pyeloureterogram showed dilatation of the pelves and calyces grade I. There was grade III dilatation of the middle and lower ureters bilaterally. Diagnosis: Multiple sclerosis, cord bladder, pyelonephritis and cystitis. Treatment consisted of a ketogenic diet regimen and daily boric acid bladder lavages, followed by the instillation of one ounce of silver iodide solution.Patient's condition improved a great deal and she was discharged on 8-6-36.

CASE 18:

White male, age 34 years, admitted on 6-25-36, complaining of inability to hold his water. Patient stated that eight years ago at the onset of his present illness he was unable to pass his water and had to be catheterized immediately. Howver, he is now incontinent. Residual urine 675 ccs. was heavily infected. Diagnosis: Multiple sclerosis with cord bladder, and cystitis. Treatment consisted of a suprapubic cystostomy. Patient made an uneventful recovery from this procedure. His urinary tract infection largely cleared up and he was discharged on 6-18-36. He was readmitted on 7-18-36 complaining of a bed sore on his left hip. His suprapubic cystostomy tube was functioning well. His urinalysis was negative. Patient left the hospital by signing his own release on 8-17-36.

CASE 19:

A white male, age 36 years, admitted to hospital on 2-23-35, with a chief complaint of pain in his legs and hips. In 1933 the patient had his back injured. Since this time there had been incontinence constantly. However, there had been several occasions when he had complete retention and at this time it was necessary to catheterize him. He has also had several attacks of colicky pain. During the last attacks he had passed small quantities of blood and on one occasion two small stones. Urinalysis showed many white blood cells. X-ray examination revealed the presence of a large renal calculus in the right kidney. Also several small vesical calculi. Diagnosis: Fracture of spine with transverse myelitis, cord bladder, vesical and renal calculi. Treatment consisted of the urethral removal of the bladder stones. A short time later a right uretero-lithotomy was done. The patient was discharged on 5-2-35 to return at later date for surgery to his fractured back. Patient was readmitted on 5-18-35. His condition was much the same as it had been on previous admission when he had a complete urinary incontinence. Urinalysis was negative. An exploratory laminectomy was done. The patient received no benefit from this procedure. He was discharged on 7-20-35. He was readmitted on 10-10-35. He had developed rather severe grade of cystitis. An indwelling catheter was put in place and bladder lavage begun. The patient's condition at this time had become so hopeless that it was felt that further treatment would be of no avail. He was, therefore, discharged on 12-21-35.

CASE 20:

White female, age 33, admitted to hospital on 3-11-27, with a complaint of paralysis of both legs which developed four months previously fol-

lowing an accident. One week following this accident the patient had complete ruinary retention and had to be catheterized daily. However, following this she was incontinent as she was on admission. Diagnosis of compression fracture of first lumbar vertebra. Treatment consisted of a laminectomy There was no definite treatment directed toward her genito-urinary condition She was discharged on 4-9-27, and readmitted on 7-19-27 complaining of a bladder stone. She also complained of dysuria, hematuria, complete urinary incontinence and incontinence of her bowels. A cystoscopic examination revealed vesicle sphincter, cystitis very severe, a stone in the bladder the size of walnut. Because of the relaxed sphincter it was impossible to dilate the bladder and it was, therefore, impossible to grasp the stone. Diagnosis at this time in addition to that on previous admission was cord bladder, vesicle calculus and acute cystitis. Treatment consisted of a suprapubic cystostomy for the removal of the calculus and a cystostomy tube was left in place. The patient made uneventful recovery and was discharged on 8-12-27. Her general condition at this time had improved considerably.

CASE 21:

White male, age 35 years, admitted on 9-30-33 complaining of being paralyzed from the knees to the hips. He also stated that it was difficult for him to pass water, having to strain. He also had dysuria and stated that his urine was cloudy and at times smelled badly. A diagnosis was made of spinal arachnoiditis with cord bladder and secondary cystitis and pyelitis. Treatment consisted of an indwelling catheter and his ureters were also catheterized on several occasions. His condition, however, continued downhill and he expired on 11-4-33, without any evidence of pneumonia.

CASE 22:

White female, age 50 years, entered the hospital on 8-17-34, complaining of bloody urine, extreme frequency and marked dysuria. Patient was catheterized and it was found that she had a residual urine of 250 ccs. which contained much blood and pus and had a very foul odor. Bowel movements were involuntary. The diagnosis was Pott's disease, cord bladder. Paralysis was flaccid in type. Acute cystitis was present and there was partial paralysis of both lower legs. Treatment consistedof indwelling catheter with daily bladder lavage and instillation of argyrol every other day. When patient was discharged on 8-29-34, her general condition seemed to have improved somewhat. She was advised regarding the continued use of an indwelling uretheral catheter.

CASE 23:

White male, age 24 years, admitted to hospital on 8-24-29, complaining of inability to walk, together with complete bladder and rectal incontinence. The condition has been of one year's duration. Urinalysis showed a trace of albumin and many white blood cells. A definite diagnosis was not established. Differential seems to be that of a hematomyelia or multiple sclerosis, cord bladder and mild cystitis. Treatment consisted of suprapubic cystostomy which was later followed by a laminectomy. The patient was discharged on 3-21-30. The suprapubic tube was draining well and the genitourinary condition was considered satisfactory.

CASE 24:

White male, age 48 years, entered the hospital on 2-7-34, complaining of a paralyzed left leg. Since the onset of present illness, which was one year prior to admission, patient stated that he had not been able to

urinate and that it had been necessary to catheterize him three or four times a day. By great effort with the use of his abdominal muscles he was able to partially empty his bladder. Bowel movements were involuntary. Diagnosis was riding breech paralysis of unknown etiology, probably due to a thrombosis, cord bladder with mild cystitis. Treatment consisted of an indwelling ureteral catheter with daily boric bladder lavages. An exploratory laminectomy was performed, from which the patient made an uneventful recovery. However, shortly after this he developed a severe epididymitis. The suprapubic cystostomy was, therefore, performed and patient recovered from this procedure and was discharged on 5-5-34.

The accompanying chart briefly gives the diagnosis, treatment and results of treatment of the cases cited above. This obviously applies only to the genito-urinary condition.

It will be noted that every case but one, namely Number 19 had urinary tract infection on admission. Case 19 had complete incontinence at time of first admission without evidence of infection. He, therefore, received no treatment. However, on his subsequent admission he had a severe urinary tract infection, which was treated by the use of a indwelling catheter. Treatment, however, was begun too late and patient expired.

Two of the cases of pernicious anemia will illustrate the principal of treating the underlying cause of the cord bladder.

Renal and vesical calculi very frequently form in cases of bladder paralysis due to spinal injury. The question is raised that if adequate drainage had been started earlier in the two cases cited would this compli-

cation have been avoided?

CONCLUSION

1. By instituting adequate drainage early urinary tract infection can be kept at a minimum in cases of bladder paralysis.

2. Suprapubic cystostomy is the method of choice for instituting adequate drainage in these cases.

3. Where possible treat the primary cause of the cord bladder.

DIAGNOSIS	NO. YRS	TREATMENT	RESULTS
Tabes Dorsalis	5	3 with indwelling urethral catheter.	1 improved, 1 improvement questionable, 1 unimproved
		2 with suprapubic cystostomy	2 improved
Luetic Myelitis	3	2 suprapubic cystostomy	2 improved
		1 intermittent catheterization	After antiluetic treatment, bladder functioned normally
Pernicious Anemia	6	2 indwelling Ure.catheter	1 after PA treatment, bladder functioned normally 1 improved
		2 suprapubic cystostomy	1 improved 1 died(condition poor on admission
		1 died before treatment start.	
		1 notherapy,except for P.A.	After th. of PA,bladder func.nor.
Hemiplegia	1	Indwelling catheter	Improvement questionable
Spastic paraplegia(familial)	1	Intermittent catheterization	No improvement
Multiple Solerosis	2	1 Intermittent catheterization	Improved
		1 Suprapubic cystostomy	Improved
Injuries (spinal)	2	1 indwelling catheter	No improvement
		1 Suprapubic cystostomy	Improved
Spinal Arachnoiditis	1	Indwelling urethral catheter	Died, septicemia
Pott's Disease	1	Indwelling urethral catheter	Improved
Etiology unknown	2	2 Suprapubic cystostomy	Improved

Approved by

John B. Dean

Date

5-16-57